GAS

ENGINEERING • UTILIZATION • LOAD-BUILDING • MANAGEMENT

MANUFACTURER
RETAILER
CONSUMER

All 3 factors in distribution welcome these 3 advanced heat control features!

1. GREATER *Simplicity*

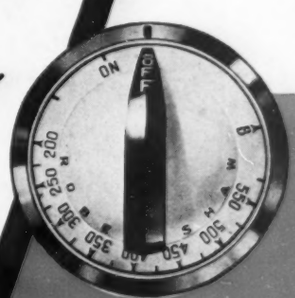
One motion turns gas on full—sets control. It saves one more operation for the user. Brings gas operating one step closer to complete automatic service.

2. GREATER *Speed*

With cock and thermostat dial combined in one unit, user will turn dial fairly high when lighting the oven. The resulting full flow of gas assures quick, safe ignition.

3. GREATER *Accuracy*

Each time oven is used, thermostat must be set. Each time oven is turned off, thermostat setting is automatically cancelled. Automatic cooking with gas is made more certain and brought into wider use.



Robertshaw can always be depended upon to provide improvements which enable gas companies and equipment dealers to *prove* to the consumer that the *best* cooking service is *gas* cooking service.

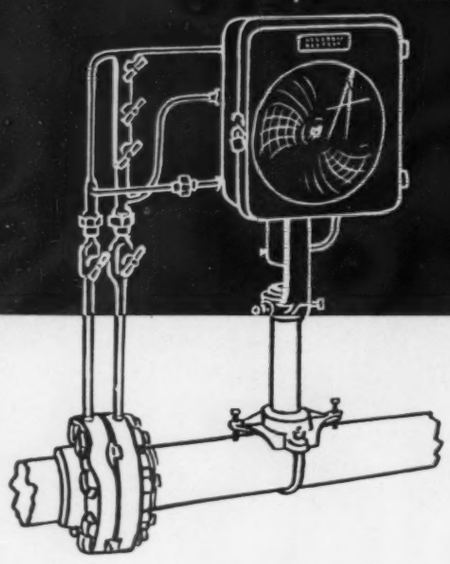
Are your salesmen armed with this efficient sales manual? It's boosting earnings for thousands of salesmen every working day. Write for a copy—free.

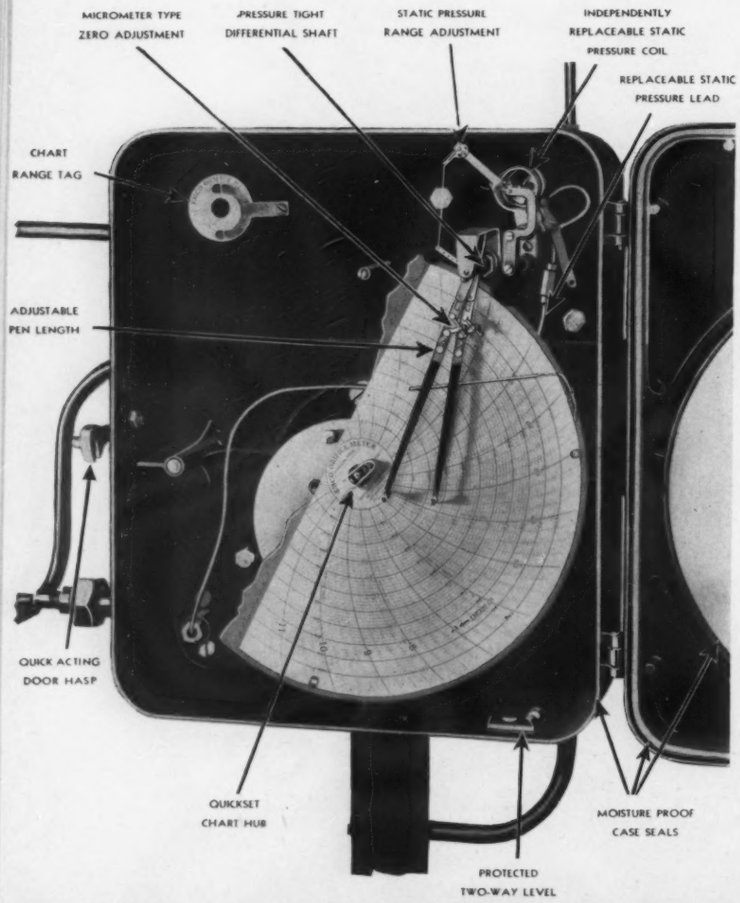
ROBERTSHAW
THERMOSTAT COMPANY
YOUNGWOOD, PA.

NOVEMBER, 1940 ◆ ◆ 25 CENTS

Details Make Perfection

. . . IN THE EMCO TYPE 38 ORIFICE METER





PERFECTION is only an ensemble of detail. In the EMCO Type 38 Orifice Meter the care and attention which have been devoted to even the most minute detail is best evidenced in the design and construction of this superior meter.

The case and case parts are outstanding examples of design perfection. The case is sufficiently large so that charts can be changed with ease. All case parts are readily accessible.

The case and cover are aluminum die cast. They are sealed by a moisture-proof sponge rubber door gasket. A quick acting door hasp seals compression as well as permitting opening or closing with one easy motion. A door lock is incorporated in the hasp. Of interest, too, is the location of the two-way level inside the case where it is protected from damage. This level is lined up initially with the differential chamber.

The chart range tag indicates at a glance the proper chart to install at each location. A "quick set" chart retainer which is integral with the chart hub, eliminates the annoyance of the loose type of retainer suspended from a chain. The pen lifter, integral with the chart plate, lifts both pens free without excessive jarring.

The service man will appreciate the improved pen construction which provides a micrometer zero adjustment and a readily accessible adjustment for pen length. However, a fixed setting for the pen is also provided which permits removal for cleaning and exact positioning upon replacement.

PITTSBURGH EQUITABLE METER COMPANY

MERCO NORDSTROM VALVE CO.

NEW YORK · BUFFALO · PHILADELPHIA
KANSAS CITY · TULSA · LOS ANGELES

Main Offices - PITTSBURGH, PA.

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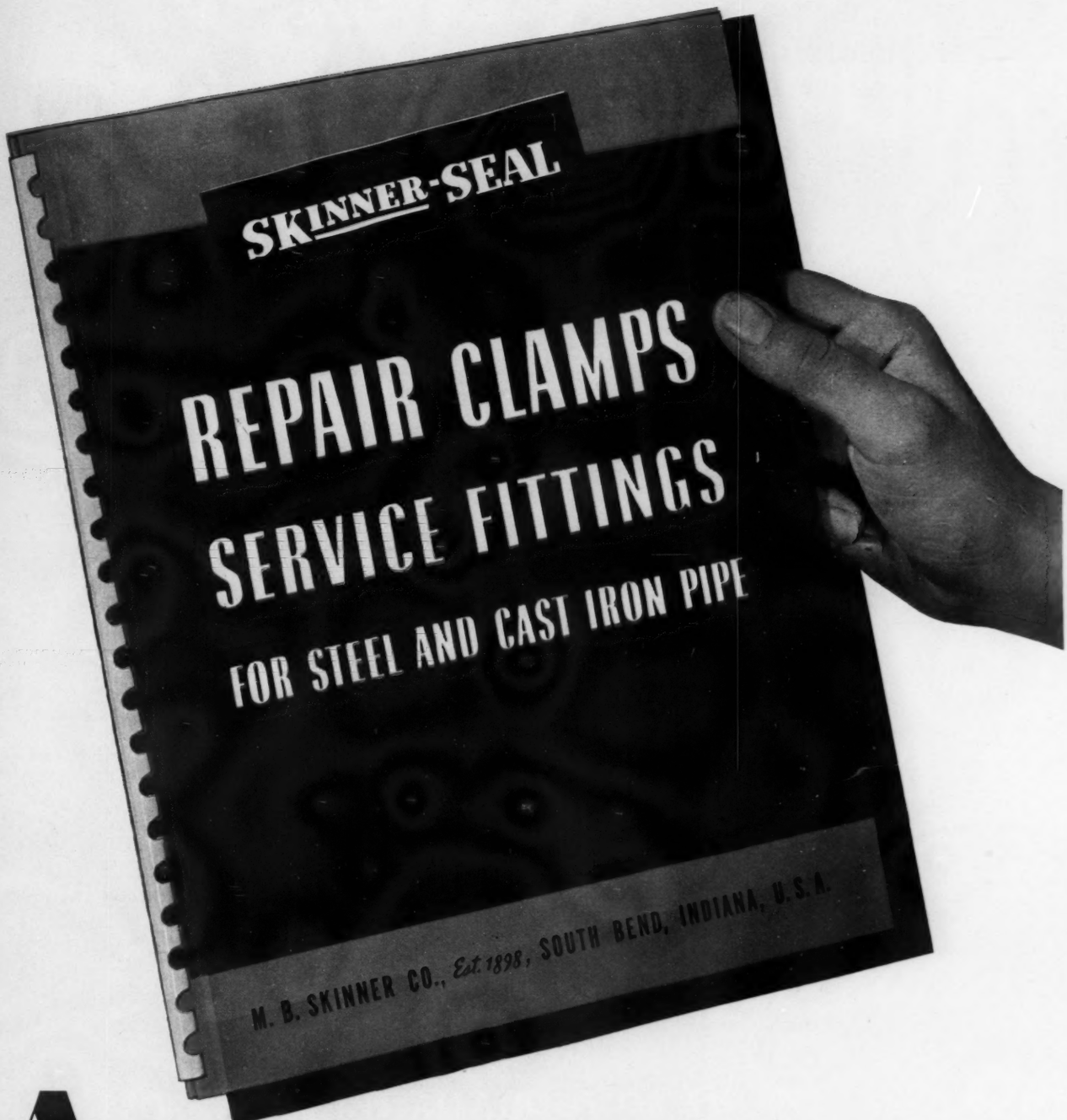
MEMPHIS · OAKLAND · HOUSTON



ANNOUNCING the new larger Skinner Catalog No. 41.* This is, however, more than just a catalog—it is virtually a manual on repair clamps and service fittings for steel and cast iron pipe, on service connection drilling methods and drilling equipment. It is complete and authoritative. There is simply nothing else like it. You can get a copy—free, of course—by writing to us on your company stationery.

* Size 8½" x 11", 40 pages, plastic binding.

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GAS

REG. U. S. PATENT OFFICE

Sixteenth Year of Publication

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Dayton
LONG SLEEVE COUPLINGS

DAYTON No. 5 COUPLING

Service Applications

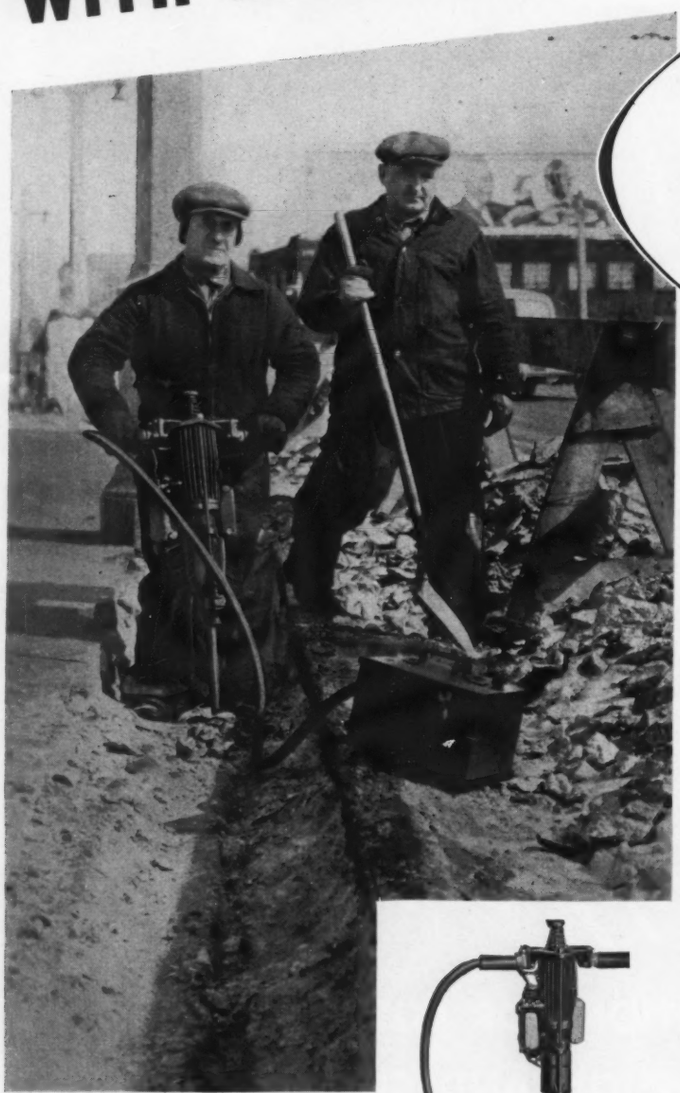
- FOR VALVE INSTALLATIONS OR CUT-INS.
- FOR EXCESSIVE EXPANSION AND CONTRACTION IN PIPE LINES.
- FOR REPAIRING BROKEN LINES WHEN A SECTION OF PIPE MUST BE REMOVED.

THE NATIONAL SUPPLY COMPANY

NATIONAL

GRANT BUILDING . . . PITTSBURGH, PENNA.

Packed
WITH MONEY-SAVING ADVANTAGES



Compact, Portable BARCOs Give Real Flexibility to Power Hammer Operations at Low Initial and Operating Cost

● Portability, compactness and versatility combine to make BARCO Gasoline Hammers essential equipment to gas, utility, maintenance and construction crews. Particularly at this time of the year — when snow-blocked roads and streets and cold weather emergency jobs are just around the corner — will it pay you to investigate these modern hammers.

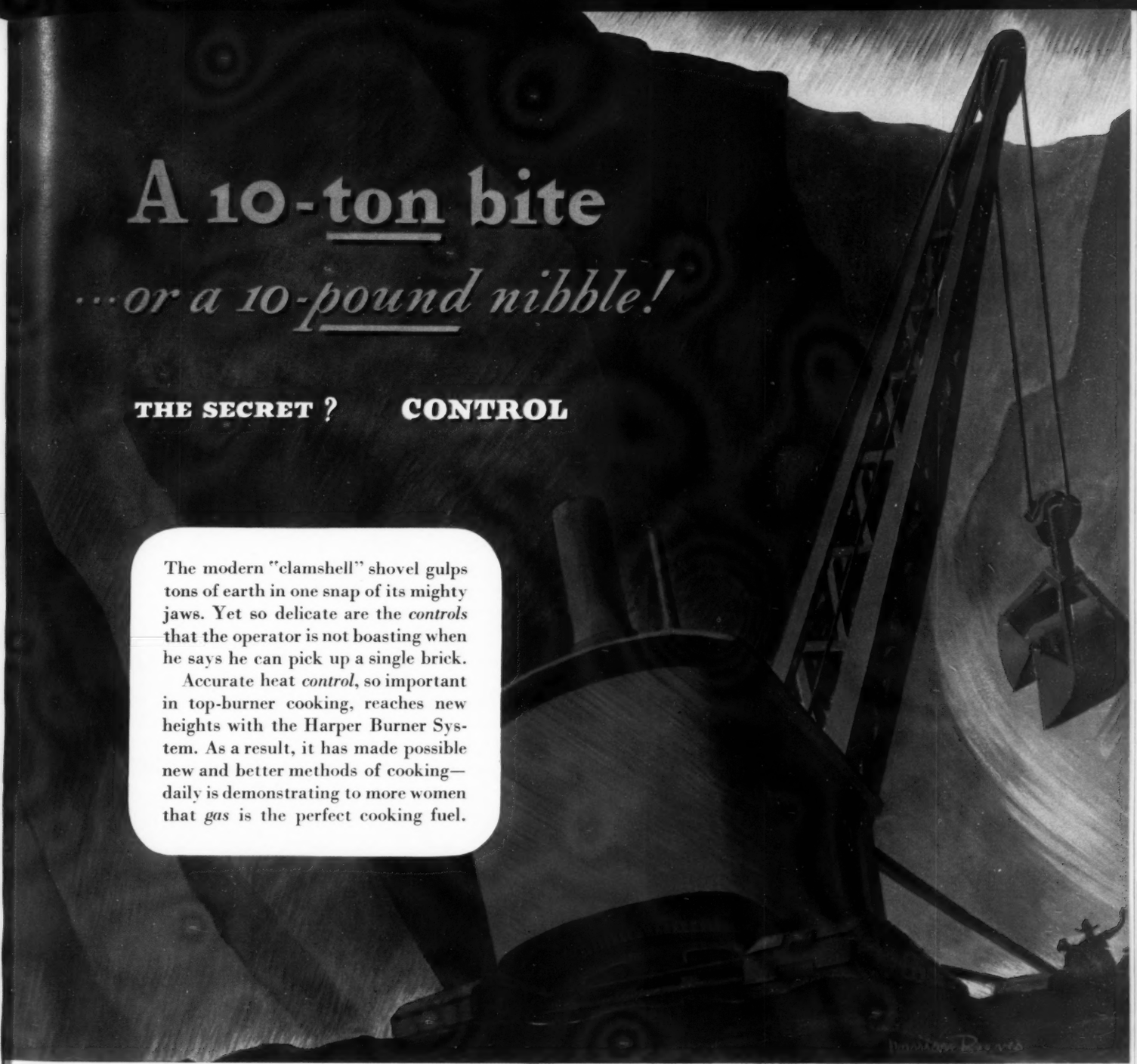
BARCOs are "all-in-one" tools, incorporating both hammer and power in a single compact, lightweight unit. They can be dispatched to jobs inaccessible to heavier equipment. They make available a supply of dependable hammer power on as many widely scattered jobs as you have hammers.

These same advantages, of special value during Winter months, save time and money all year round—providing a constant source of hard-hitting power where you want it, when you want it — whether it's breaking, driving, drilling, digging or tamping — at a surprisingly low initial investment and maintenance cost.

The local BARCO distributor will be glad to show you one in action — on a job of your own choosing. Get in touch with him today.

BARCO MANUFACTURING CO.
1830 Winnemac Ave., Chicago, Ill.

BARCO *Portable* GASOLINE HAMMER


A 10-ton bite
...or a 10-pound nibble!
THE SECRET ? CONTROL
The modern "clamshell" shovel gulps tons of earth in one snap of its mighty jaws. Yet so delicate are the *controls* that the operator is not boasting when he says he can pick up a single brick.
Accurate heat *control*, so important in top-burner cooking, reaches new heights with the Harper Burner System. As a result, it has made possible new and better methods of cooking—daily is demonstrating to more women that *gas* is the perfect cooking fuel.

Copr. 1940, Harper-Wyman Co.

CONTROL *is the secret here, too*

● The Harper Burner System is a patented invention whereby each of the burners on the range is actually 2 burners in 1 . . . a burner within a burner . . . both operated and controlled by a single handle.

This arrangement affords a high-speed STARTING BURNER to *start* foods boiling and for fast frying . . . plus a small, central, economical COOKING BURNER for *maintaining* the cooking. The COOKING BURNER can be used entirely independently of the STARTING BURNER. No other top burner possesses this vital advantage — which insures easy, accurate control: just the right heat for every type of top-burner cooking . . . every time.

HARPER-WYMAN COMPANY
8562 Vincennes Avenue, Chicago, Ill.

HARPER BURNER SYSTEM

HARPER BURNER SYSTEM

Demonstrates GAS at its best

SEE OTHER SIDE OF THIS PAGE

"THE HARPER BURNER SYSTEM KEEPS US WHOLE AND WHOLESOME!"

FACT:

The secret of success in cooking vegetables is to "boil them gently". Otherwise they reach the table in a soggy, tasteless condition, literally boiled apart. Also, a goodly share of important vitamins may be lost by too rapid boiling and too much water.

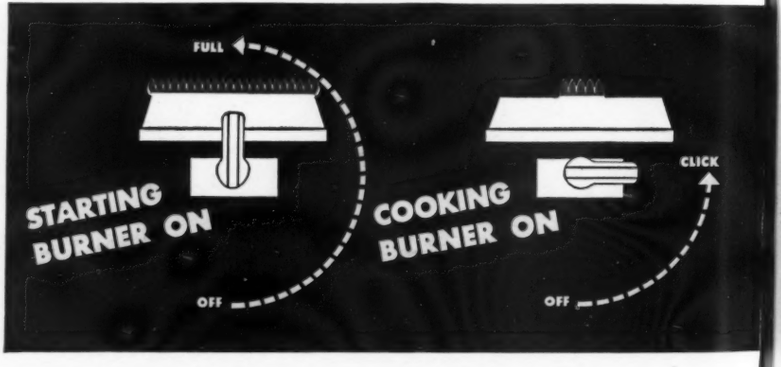
This trouble can be easily corrected with the Harper Burner System. For it gives far more accurate heat *control*, and is adjustable to lower heat levels than ordinary top burners.

REASON:

Only a little water — a cupful is plenty—is needed to cook vegetables, *when the proper amount of heat is used.* After the water is brought to a boil by the big Harper STARTING BURNER, the small, economical COOKING BURNER takes over the remainder of the cooking. It will maintain the water at the boiling point of 212 degrees—"boils them gently".

BENEFITS:

No danger of the vegetables scorching or burning dry with the COOKING BURNER flame. Very little water is evaporated, thus saving gas because less water must be heated. More of the vitamins and minerals are retained because less water is present to dissolve them, and over-boiling is avoided. There is no need of constant pot-watching.



The Harper Burner System provides a burner within a burner. The diagram above shows how the COOKING BURNER operates entirely independently of the STARTING BURNER. Yet both are controlled by the same handle.

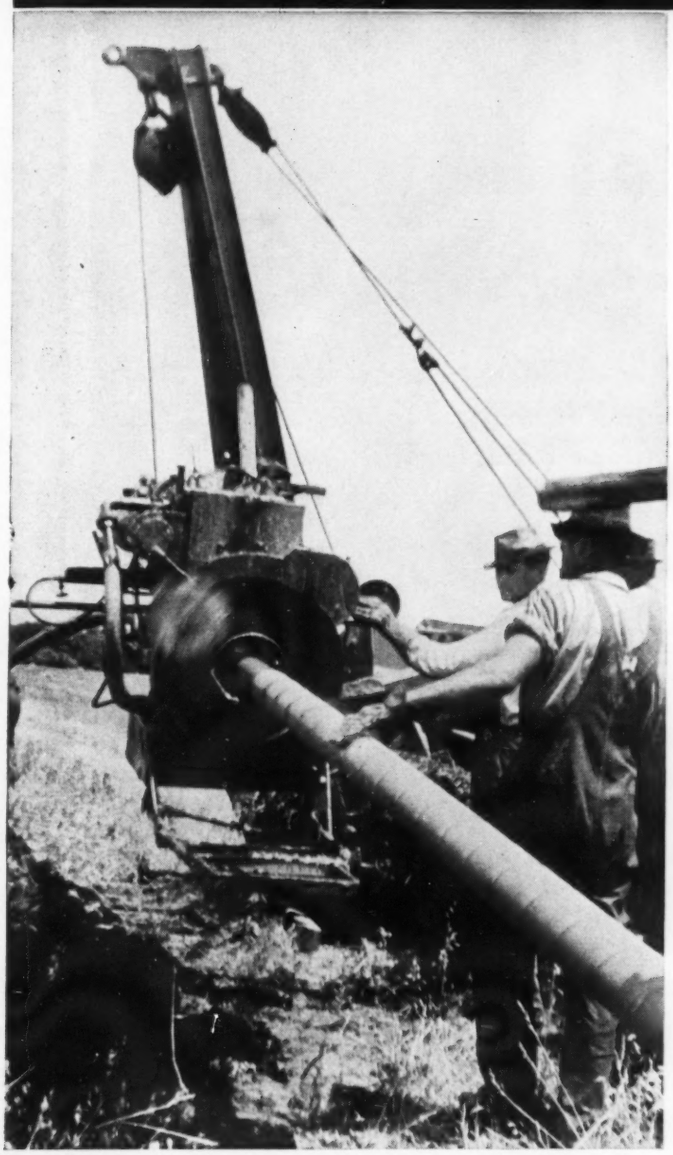
We shall be glad to send you, without cost, two booklets that tell the complete Harper Burner System story . . . "Modern Methods of Top Burner Cooking" and "The Greatest Cooking Discovery in 40 Years". They should be valuable to anyone interested in the promotion of gas cooking and gas appliances. *Harper-Wyman Company, 8562 Vincennes Avenue, Chicago.*

SEE OTHER SIDE OF THIS PAGE

HARPER BURNER SYSTEM

HARPER BURNER SYSTEM

HERE'S Pipe Line Protection to Fit Your Individual Requirements



Traveling type coating and wrapping machine applying NO-OX-ID and NO-OX-IDized Wrapper to a new transmission line being laid in Texas. This NO-OX-ID combination gives lasting protection against corrosion.

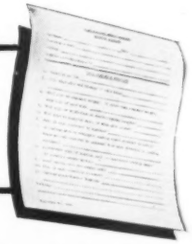
Whether you want to protect 100 feet of service lines or 1000 miles of transmission lines, there is a combination of NO-OX-ID rust preventive coatings and NO-OX-IDized wrappers to fit your soil condition and method of application. These combinations may be applied by any desired method—either hot or cold, by hand, traveling machine, or stationary machine.

NO-OX-ID and NO-OX-IDized Wrappers Provide Four-Way Protection

NO-OX-ID combinations possess all the qualities necessary for complete underground protection. They possess high dielectric strength, even after being immersed in water for long periods. They are resistant to bacterial attack. Then too, the physical characteristics of NO-OX-IDized wrappers prevent soil attachment and thereby eliminate the shearing effects of soil action. In addition, NO-OX-ID contains proven rust inhibiting chemicals that prevent pitting under the protective coating. You can benefit by the economies of NO-OX-ID and NO-OX-IDized wrappers as many gas companies are now doing.

DEARBORN CHEMICAL COMPANY
Dept. B, 310 S. Michigan Ave., Chicago

Write for questionnaire to get recommended NO-OX-ID Specifications.



GREATER PROFITS!

BUTANE-AIR
and
PROPANE-AIR

SAVED 41%

IN GAS PRODUCTION COSTS!

But that's not all this mid-western gas company accomplished by converting from carbureted water gas to propane-air and butane-air operation. A comparison of figures for the years ending May 31, 1937 (last full year before conversion) and May 31, 1940 shows:

15.2% Increase in Customers
(maximum number)

18.9% Increase in Sales per Customer
(in cubic feet)

37% Increase in Total Metered Sales
(in cubic feet)

WITH NO CHANGE IN GAS RATES!

Think what similar savings and similar increases in public acceptance can mean to your properties! Call, write or wire for complete information.

Philqas
DIVISION
PHILLIPS PETROLEUM COMPANY
GENERAL MOTORS BLDG.
DETROIT

NEW YORK • PHILADELPHIA
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MILWAUKEE • ST. LOUIS
AMARILLO

NATION'S LARGEST MARKETER OF LIQUEFIED PETROLEUM GASES

G-203 Teehead Standard Gas Stop in sizes ¼" to 2".

K-CO *Accent on Quality*

It is no trick to build an ordinary brass gas service stop. But when for over 40 years you have been constantly meeting the exacting requirements of the Gas Industry, you have more than a gas stop—you have *the* KITSON Gas Stop.

And so it goes with all KITSON gas company fittings. In each is embodied the research, precision tooling and experienced workmanship which spells K-CO quality.

Let us quote you on

GAS SERVICE STOPS

EMERGENCY GAS SHUT-OFF VALVES
(For circulating water heaters)

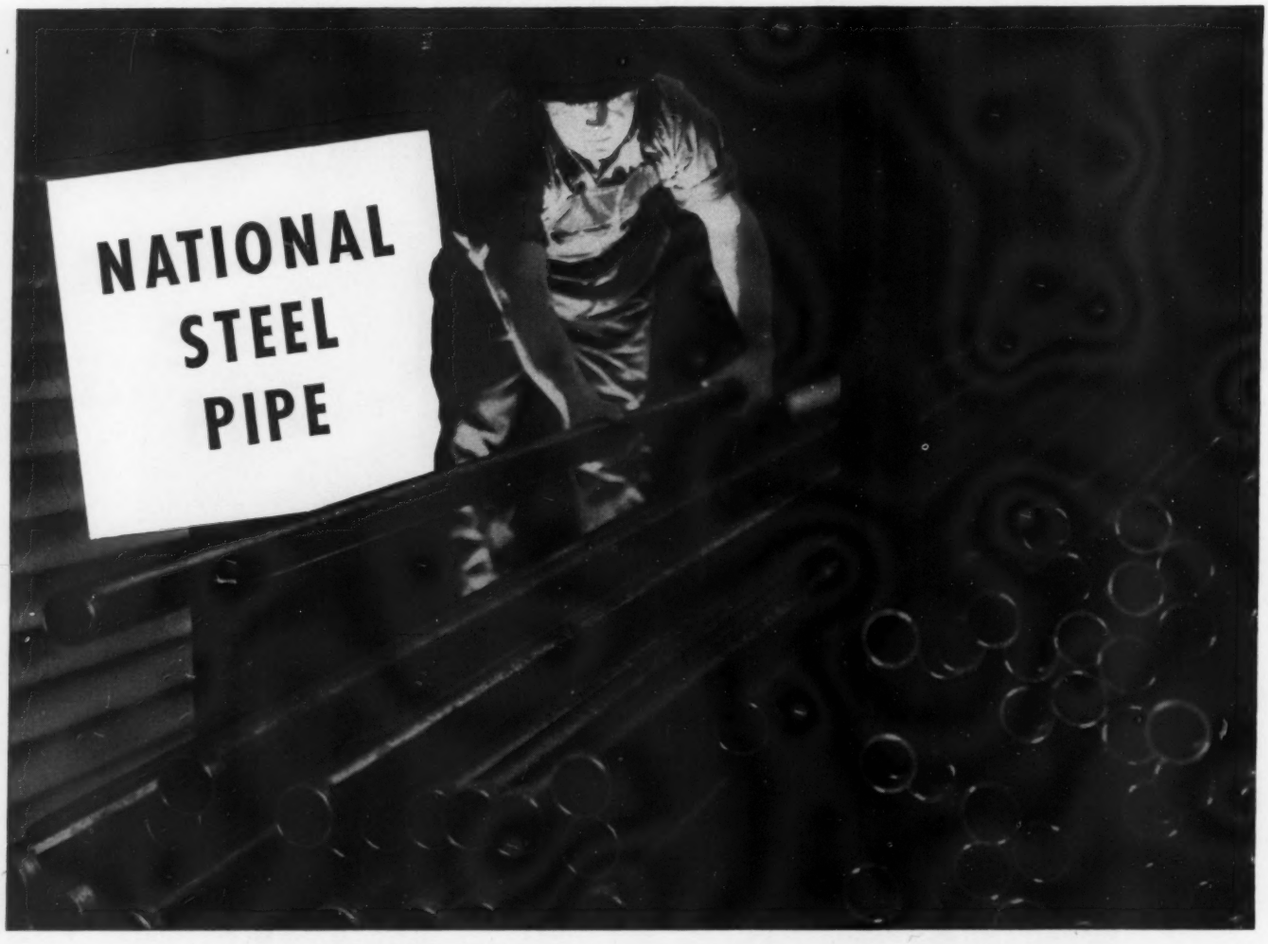
METER BARS

TEMPERATURE and PRESSURE RELIEF VALVES

Send for your copy of KITSON Catalog "A"

KITSON COMPANY
2409-15 Westmoreland St., Philadelphia, Pa.
Manufacturers of Kitson Safety Controls for manual and automatic Water Heaters . . . Quality Brass Goods for Gas, Water and All Plumbing Uses.

AMERICA'S STAND-BY
. . . for more than 50 Years!



TO win and hold leadership for fifty years — that's something that can be said about comparatively few products. But it applies in every way to Steel Pipe, the backbone of the nation's piping systems. Other types of pipe may come and go, but Steel Pipe seems destined to go on and on as America's Number One Pipe. Number One in value. Number One in usefulness. Number One in sales.

During all these years, though still fundamentally the same strong steel pipe of fifty years ago, NATIONAL Pipe has been constantly refined and improved to keep abreast of the changing needs of industry. It is today cleaner, stronger, more uniform, easier to work. Higher quality steels, processes for removing scale and retarding corrosion, all have contributed to give you the greatest value per dollar of cost in NATIONAL Pipe.

To serve your piping requirements with all possible speed and efficiency, NATIONAL Pipe is made available to you through a nation-wide system of quality distributors. These distributors, carefully selected for their ability to give you exactly the kind of service you require, are located strategically in every major commercial center. They are qualified to help you in every problem involving pipe. Write for complete data on NATIONAL Pipe for gas laterals and service lines.

NATIONAL TUBE COMPANY

PITTSBURGH, PA.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Export Company, New York

UNITED STATES STEEL

Protect BY ADEQUATE ODORIZATION WITH

PENTALARM

THE WARNING ODOR FOR FUEL GASES

If you want complete, positive odorization at a cost of less than 1/10 of a cent per 1000 cu. ft. of gas, PENTALARM is the answer. This "warning odor" for fuel gas is so powerful that 100 gallons of PENTALARM will odorize approximately 1,000,000,000 cu. ft. of gas and PROTECT your pipeline investments continuously.

PENTALARM bypass odorizing units may be built by your own workmen from materials already on hand—and introduction into the system is as simple as opening and closing a valve!

Permanent, accurate records of the intensity of PENTALARM odorization are made by means of the new PENTALARM COLORIMETER.

PENTALARM YOUR PIPELINES! RECORD IT WITH THE COLORIMETER!

THE SHARPLES SOLVENTS CORP.

PHILADELPHIA CHICAGO NEW YORK

SHARPLES TRADE MARK SOLVENTS

Proved in principle and practice

Mechanical joint cast iron pipe is double-checked by principle and practice. The pipe material itself has a service record of a century, even two centuries and more. The bottle-tight, stuffing-box type, mechanical joint is based on a universally accepted engineering principle. All mechanical joints, designed and made by C. I. P. R. A. members, are based on this time-tried principle. All are bottle-tight.

Look for the "Q-Check" registered trade mark. Cast iron pipe is made in diameters from 1¼ to 84 inches.

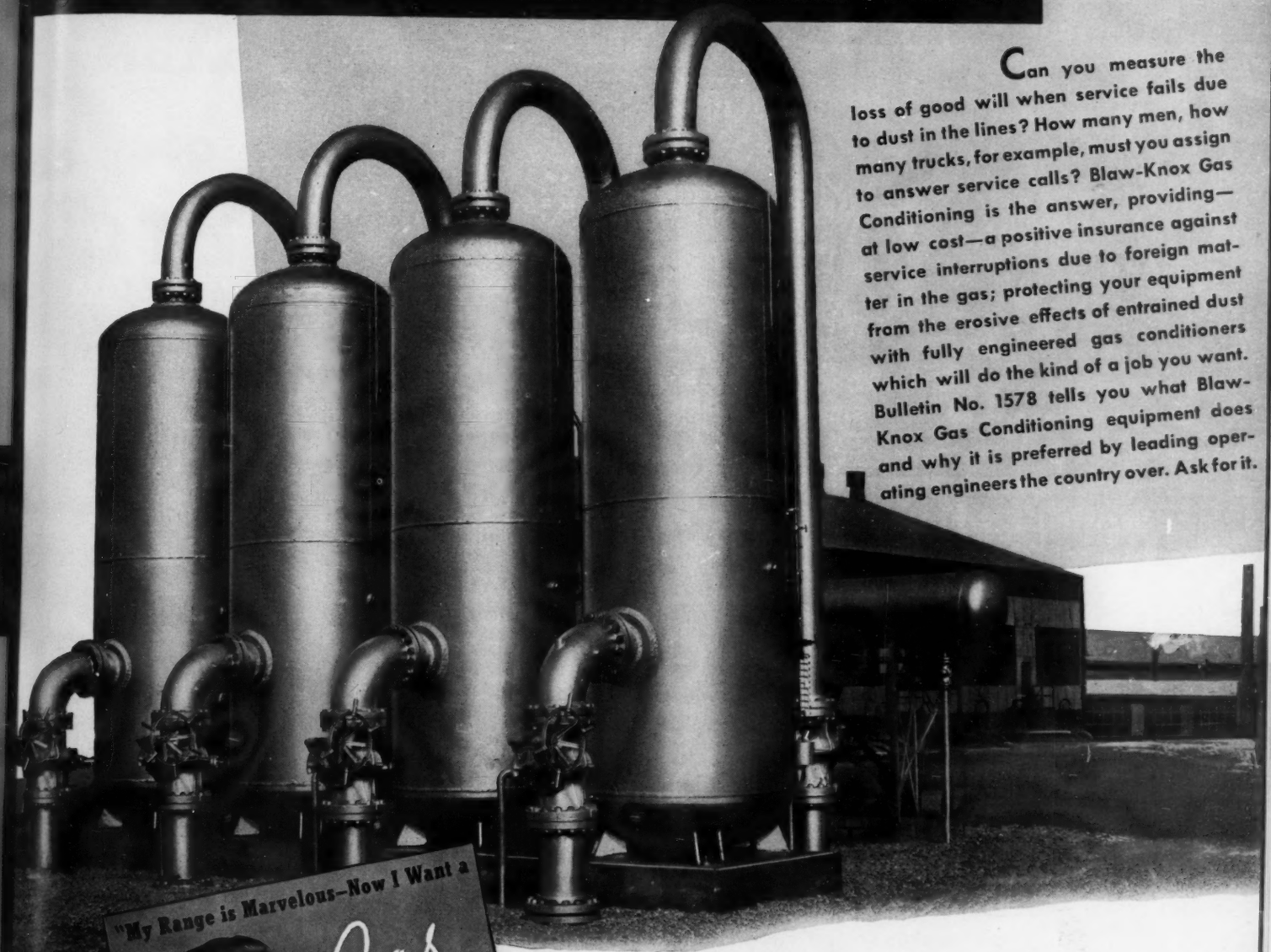
THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEARCH ENGINEER, 1013 PEOPLES GAS BUILDING, CHICAGO, ILLINOIS

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

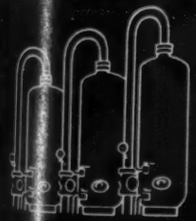
Assembling any of the mechanical joints made by C. I. P. R. A. members is a simple, swift operation with unskilled labor and a wrench. These joints differ in design but all are based on the bottle-tight stuffing-box principle.

More Profit in Blaw-Knox *Conditioned* GAS!



Can you measure the loss of good will when service fails due to dust in the lines? How many men, how many trucks, for example, must you assign to answer service calls? Blaw-Knox Gas Conditioning is the answer, providing—at low cost—a positive insurance against service interruptions due to foreign matter in the gas; protecting your equipment from the erosive effects of entrained dust with fully engineered gas conditioners which will do the kind of a job you want. Bulletin No. 1578 tells you what Blaw-Knox Gas Conditioning equipment does and why it is preferred by leading operating engineers the country over. Ask for it.

Up go sales of appliances, down go service costs when GAS does its job unfailingly. As engineers know, nothing but CLEAN gas is dependable . . . especially when used with modern appliances which have smaller apertures and more delicate mechanisms.



A few of the many advantages of Blaw-Knox Gas Conditionin

1—High capacity; gives full value per dollar invested.

2—Gas is thoroughly cleaned, no half measures. Dust and other foreign matter is dynamically forced into intimate contact with washing liquid.

3—Delivers perfectly clean, dry gas (if desired, equipment will resaturate with oil or water vapor).

4—Pressure losses cut. Very little loss in contacting and separating sections.

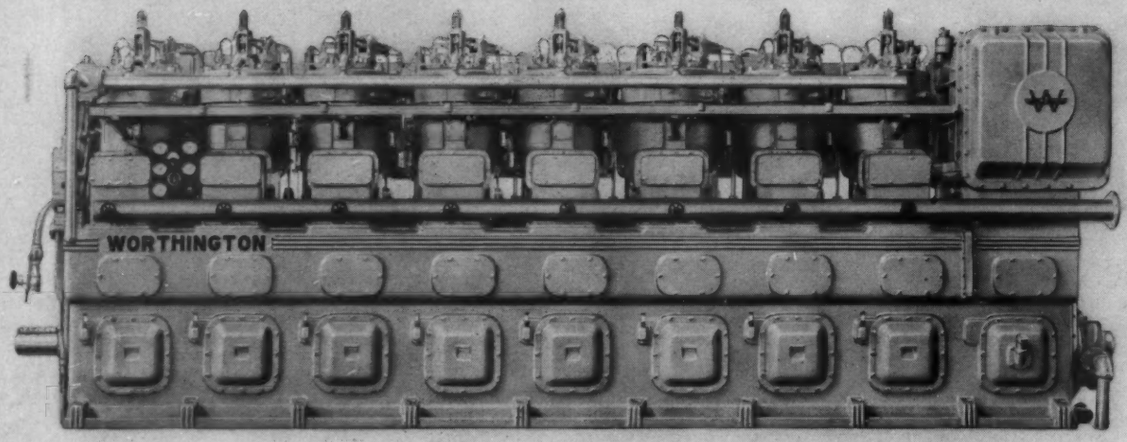
5—Dust and dirt are completely removed from gas flow.

6—Blaw-Knox Gas Conditioners are the result of many years' research and experience in dust removal and separation of liquids from gas.

BLAW-KNOX
GAS CONDITIONERS

BLAW-KNOX DIVISION of Blaw-Knox Company • FARMERS BANK BLDG., PITTSBURGH, PA.

HEAVY CONSTRUCTION THROUGHOUT...



A 1000 hp.
LTC unit

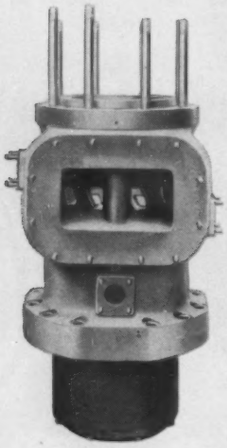
a basic design feature of

WORTHINGTON LTC

ANGLE ENGINE-COMPRESSORS

IN engines built for mobile equipment, or where frequent changes of location are contemplated, light weight construction is essential. However, for stationary engines, designed for long life and continuous full load service, light weight is not desirable.

HEAVY CONSTRUCTION implies the placing of ample masses of metal *in correct structural relation,* to assure *strength, rigidity, maintained alignment, low wear, long life.* The result of all these factors is LOW-COST, TROUBLE-FREE OPERATION.



Cylinder

Cylinder Liner

THE FRAME, the "backbone" of the engine, is carefully designed. Thick walls and flanges, heavy ribbing, box sections, long bearing seats, large studs, deep oil sump —all contribute to strong, rigid construction.

THE CYLINDERS, with replaceable liners, are massive, individual castings—flanges are deep, studs are numerous and large.

THE CYLINDER LINERS are of alloy nickel iron, removable for jacket cleaning, and permitting low cost replacement. They bear on the cylinders at four points, and are double sealed against jacket leakage.

THE MAIN BEARINGS, with steel shells, are held rigidly in place by heavy cast caps and four studs as shown in the picture at the right, assuring permanent alignment and minimum shaft deflection.

THE SHAFT is of large diameter with heavy crank webs.

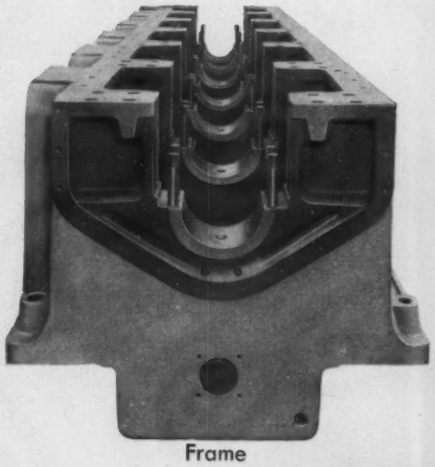
●

SIX SIZES

375 . . . 500 . . . 625 . . . 750 . . . 875 . . . 1000

BRAKE HORSE POWER

COMPRESSOR CYLINDERS—A wide selection of types and designs are available, in cast iron, cast steel or in steel forging as pressures may require. These follow the usual Worthington design as used on motor and steam driven compressors.



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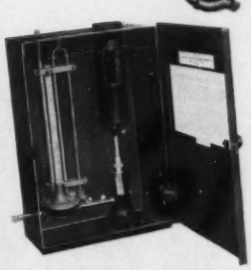

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GUEST Editorial

Our Opportunity To Serve

By A. B. GROESBECK Vice President and General Manager, United Gas Corp., Operating Division

OUR job as Americans today is cut out for us—it is to help raise our national defenses to a point where our democracy may continue unharmed by destructive forces at work in other parts of the world.

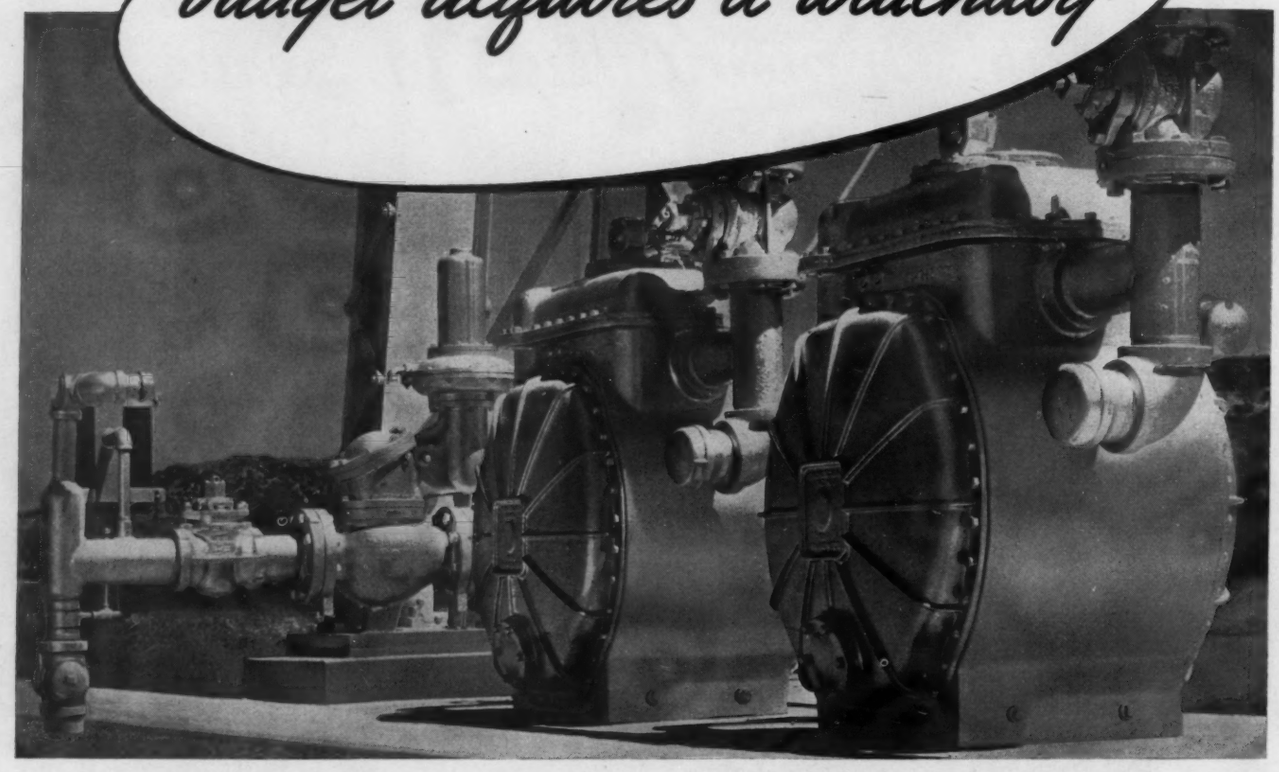
The affairs of all of us are affected in some way or other by the European war and our preparedness program. Our feelings are stirred day in and day out by the tremendous news from abroad continually brought to our eyes and ears. Patriotism moves us deeply—we feel the urge to do something for our country.

In the quickening stir of national defense preparations those of us in the gas industry are giving thought to the steps necessary to be taken in order that the full resources of this great industry may be directed to be an effective aid in this program. This is a good thing for the nation—the fact that its people take its welfare thus seriously. I have a feeling, knowing this industry as I do, that our part in the national scheme will be well performed and that the full supply and utility services of this industry are even now ready and available to serve when and where needed by our country. So in due time each of us will be increasingly discharging greater duties as a part of the greater plan. Some, of course, will be asked to serve with the military forces; others, and by far the greater number, will be advised that they can render the maximum service by staying on the job, making use of their experience and technical skill to keep the fires of industry and our homes alight.

It is worth remembering that the United States needs and will need dependable fuel service more in the coming months and years of high-speed preparedness production than perhaps ever before in history. Only we who are skilled and experienced in this business can adequately render such service. It is the responsibility of the gas industry, through its skill and resources, to keep the great facilities of the industry geared to the requirements of the national emergency defense program. We are ready now and will always be so. Progress and accomplishment in preparedness will in no small measure take place across *our* desks, in *our* plants and on *our* properties, just as on the drill field and in the airdrome. For this part we are prepared and to its success we pledge our skill and resources.

For those among us who are called by the distinguished men directing our national defense program to duty elsewhere, under arms or in other special activity, there is glorious service to our country. For those of us not so chosen there too is a service and duty to be given and discharged. These new responsibilities the industry accepts and it will discharge them adequately, willingly, and efficiently, as it has those of more peaceful times.

another HOLLYWOOD budget acquires a watchdog



■ Out of the thousands of METRIC-AMERICAN Ironcase Meters in service, these two have perhaps a special interest because of their association with one of Filmdom's stellar names.

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THERMALLY *Thinking*

As Others See Us

We admire the courage of The Brooklyn Union Gas Co. in engaging outside experts to conduct an analysis of public opinion among its customers, and we applaud its decision to allow the findings to be made the subject of a report before the recent A.G.A. Convention.

Convention oratory notwithstanding, we have long been troubled with the haunting suspicion that one of the major faults of the gas industry is that of complacency. The load we have we will probably be able to hold. We know our service is good and we suppose the public knows it, too. If they don't, they at least pay their bills — so what? As long as service complaints are kept within a reasonable minimum, we assume that everybody with a meter in his basement just loves the gas company like a brother.

It is a little disquieting, therefore, to find that not only in Brooklyn territory, but in other sections of the country as well, the general public doesn't always regard the gas industry or the fuel that it supplies as representing anything like the last word in modernity. It is time to pause and reflect when a survey shows that whereas 93% of the families interviewed are now cooking with gas, only 25% expect gas to be the most used cooking fuel 10 years from now.

Electrical promotion and propaganda, participated in by every branch of the electrical industry, are having their effect on the public consciousness. They have not been able to corner even an appreciable share of the cooking load, but they have been able to capture the public fancy. And to those who even now identify electric cooking with progress, it is only a short step to the desire and the readiness to get in step with such "progress."

Gas promotion and merchandising of everything from the fuel to the appliances that burn it has advanced rapidly in the last decade. But if the facts turned up by the survey are indicative of the country as a whole (and the business consultant for "Fortune" magazine who planned the procedure states flatly that they are) then the activity, praiseworthy thought it may be, simply hasn't been good enough.

More money must be set aside for advertising, promotion, and institutional campaigns, and more good honest thinking on the part of management must be devoted to analyzing and directing the trend of public opinion as it affects the gas industry.

The criticism that we are standing still is heard too frequently not to warrant the application of immediate corrective measures. The enthusiasm and the confidence that we feel in our industry must be constantly transmitted to the world outside of the limited circle of gas men. For it is from that outside world that we derive our sustenance, and it is on its goodwill and enlightened opinion that we depend for our very existence.

Ever Onward

By the time these words are read the 1940 presidential election will be a matter of history, and about 55% of the population will be shouting from the housetops while the remaining 45% will be filing quietly out of the crying room. The political prophets who guessed wrong will be lugubriously thumbing through their surveys to see where they slipped up, and the ones who prophesied right will be issuing press releases extolling their own amazing accuracy.

But winners and losers alike, which includes every citizen who had an opinion on the course the country should follow, will have profited by the experience. And each side can console itself with the expectation that the opposition won't dare prove themselves the rascals that campaign condemnation pictured them. And realism requires that we face the fact that things never turn out as badly, or as well, as the heat of the hustings would indicate.

For just as conservatives and reactionaries are rudely torn from their trust in the status quo, so ruthlessly are the wild and chimerical schemes of the visionaries blasted under the devastating bombardment of practical common sense. The necessary reconciliations of extremes of viewpoint is achieved through the functioning of the great process that is known as Democracy; and men and machines move on, moulding a greater America not because of the magic formula of a man or a party, but in obedience to the dynamic challenge of a nation moving ever toward its destiny.

A true believer in Democracy can never doubt the ultimate wisdom of Democracy's choice, unreasoning, emotional, ill-informed though its decisions may momentarily seem to be. We believe in Democracy, and because we do so believe, we know that there is and can be no disunion, no confusion in the ultimate goal toward which we all aspire. We have merely been offered a choice of paths toward that goal; and while ours has seemed to us the most direct, we can never lose sight of the fact that other roads lead there too.

On November 6th the sun will again rise over our land, and factory whistles will blow, and marching civilians and soldiers will move as before to their appointed posts, to enrich, to build and to defend the thing of which their lives and souls are part. For the essence of Democracy is not that our faith resides in any man, but rather that our faith and our belief we eternally rest on men — the men of America.

Gas Goes Into Action

On the Home Defense Front

By FRANKLIN T. RAINEY

Ohio Fuel Gas Company, Columbus, Ohio

THE foremost problem confronting the country today is that of national defense. We of the gas industry are concerned with it in two respects; first, as citizens for what we may expect in the way of protection and the preservation of our democratic ideals; and secondly, as members of a great industry that will play a most important role in the preparation and development of the defense program.

One may think the responsibility of the gas industry rests in ample production and the continuance of the good service that characterizes its performance during peace times. These same qualities will apply with even more emphasis in these times of emergency. But sabotage and damage to our plants are now factors to be considered in light of the present situation.

As far back as 1935, Germany recognized this situation, and through constant rehearsals with picked personnel for specific duties, developed production and service plans and enacted the roles for the maintenance of supply and service. Let us be prepared, likewise, for any similar emergency.

Our Responsibilities

However, our responsibilities do not end here. Both our responsibilities and our opportunities extend far beyond this point. We must increase our facilities and our personnel far beyond the necessities of peace time. The national defense program is an additional requirement to be carried without any sacrifice to the requirements of normal times. If this defense program is to be successful, it is reasonable to assume that each cubic foot of gas, each individual employe, and each dollar of expense must produce greater results than ever before, and these results must be accomplished with the ultimate expediency.

Speed and a greatly accelerated tempo will be the theme from now on. Men of broader vision, of more creative imagination, and of greater ability, are more than ever required.

Our industry is a most important one; without it the defense program, unquestionably, would be less successful. Because of this fact, we should all embrace enthusiastically the great opportunity that lies ahead of us and assume more than our normal responsibilities in this emergency. Patriotism means sacrifice. Political and economic consideration must be fair and just.

This is all the gas industry expects in return for the fine contribution it is making, and will continue to make, toward the building of a program that will assure to all peoples in this country the three cardinal points of industrial and national freedom: first, representative democracy; second, civil and religious liberty; and third, free private enterprise.

The magnitude of such a program, already earmarked by expected appropriation of some 36 billions of dollars during the next five years, is truly difficult to realize. But it is a reality, and in it we have a definite assignment to perform.

Our greatest contribution will be that of not only furnishing gas to industry, but developing and assisting industry in new and better ways of utilizing our product. This, then, will be a cooperative assignment, involving the combined personnel of three great industries; the gas industry, through its industrial sales engineers, the gas equipment manufacturers, and all industries making any specific defense product must all combine their talents to effect with speed and efficiency the desired results.

This being the case, how well qualified are we for such a role? Have we kept pace with industry? Is our industrial personnel qualified for such an undertaking? Do gas appliance manufacturers have the required equipment? Is there understanding and confidence among the three interested parties?

I am sure all these questions can be answered in the affirmative, but let us analyze a little and see what has been accomplished since the last war, so that we can, perhaps, project the results and accomplishments that may be expected in the program that lies ahead.

During the last war, few trained industrial personnel existed in the gas industry. There was little gas-fired equipment, utilizing gas as a fuel, as we have today. Industry used gas fuel, but by means of any make-shift method that could be figured out at the time, by men totally unprepared by experience or training for an assignment of such magnitude and importance. Efficient heating methods and applications had not yet been evolved.

The Situation Today

Today, because of systematically-planned and far-sighted policies adopted by most gas companies, we are fortified with thousands of trained and experienced industrial engineers with well-established contacts that have won the trust and confidence of industry. This is not the result of the hysteria of the moment, but rather the result of patient and thoughtful consideration to this policy over the last 20 years, enabling us to understand and help solve the many problems of our customers.

This has merited and won the customer's confidence to the extent that now he not only solicits, but expects and demands this assistance in solving his industrial heating problems. The importance of such a changed situation is perfectly obvious to all, and as proof and evidence that it actually exists, may I remind you that although the business index this year is below that of 1929, industrial gas sales are 50% greater than in 1929.

Through cooperation between the gas industry and gas equipment manufacturers, there has been developed since the last war, superior methods and heating equipment for industry. These have resulted in the wider availability of better steel, bronzes, and other metals than were formerly obtainable. We now have the inert atmosphere furnaces, with many types of atmospheres, which permit the maintenance of bright surfaces for metals, the reduction of surface oxides on metals, and prevent decarburization, or

softening, of metal surfaces. There have also been developed furnaces for carburizing, or hardening metal surfaces, using gas not only as the source of heat, but also as the hardening agent.

In addition, there have been developed many types of continuous furnaces, with heat-resisting alloy mechanisms for conveying materials through furnaces operating at high temperatures, under accurate temperature control, exact fuel proportioning, and producing definite results. Through these various combinations, there has been opened to gas new fields of chemical and physical applications, aside from its use as a source of heat. All of this means a greater production of superior materials at less cost.

Have We Kept Pace?

Have we in the gas business kept pace with industry? My answer is definitely *yes*, and with all modesty we can claim a major share of the credit for the improvement of heating methods and equipment found in industrial use today.

How, then, will gas and such equipment be used in furthering additional values in this program for national defense? The scope and multiplicity of its application is truly staggering to the imagination. Thousands upon thousands of defense products will be dependent in their making upon gas. In fact, there will hardly be an article made, regardless of size, that has not undergone some gas heating application.

Expanding and new army training areas will require gas for cooking, baking, water heating, and other operations necessary for the production of food for the ultimate army of three and a half million men. Gas will be used in the preparation of both the canned and packaged type foods. Gas will heat the water and cleaning solutions, and do the singeing to prepare wool to supply thousands of blankets to the army, while it will burn the clay or process the metal for thousands of dollars worth of eating utensils for the navy.

Gas will also be the fuel in the huge clothing depots for steaming and processing cloth for uniforms. From the first thing the soldier puts on in the morning, his shirt, which required gas for tentering, singeing, processing, and ironing, to the bedspring on which he lays at night, which has been processed and tempered with gas, he will come in contact throughout the day with article after article made serviceable because of gas applications.

Gas will have put into his rifle, through many delicate heating operations, those exacting qualities that make possible the expert marksman.

Gas will activate the carbon, or absorbing agent, in his gas mask and produce the glass for his goggles.

Gas will be required for melting, forging, nosing, and heat treating all sizes and types of shells so as to increase their range of fragmentation for greater destructiveness, and gas will put into the anti-aircraft guns those qualities for speed and precision upon which their success depends. For the huge 16-in. guns, it will be gas that so toughens and hardens the metal to make them capable of sending 3000 lbs. of steel and explosives 30 miles through the air.

In the chemical field, the gas industry will provide many of the materials required. As a by-product of manufactured gas, the most obvious war materials are the explosive bases, toluol, and other benzene homologs. Research

F. T. RAINEY

MR. RAINEY is general sales manager of the Ohio Fuel Gas Co., Columbus, Ohio, and for the past year has served as chairman of the American Gas Association's Industrial Gas Section. Mr. Rainey delivered this paper under the title, "The Gas Industry's Opportunity in National Defense," at the 22nd Annual Convention of the American Gas Association, meeting in Atlantic City, N. J., October 7-10, 1940. —(Abstract by GAS.)

is now being conducted on the nitration of paraffin hydrocarbons that may lead to commercial exploitation of explosives said to be far superior even to T. N. T. Also, the availability of chloropicrin, which serves as a linking agent for other chemicals, and in itself a fine lethal gas, may find an increasing use in the field of munitions.

Gas will be required for heating stills, retorts, etc., for the production of nitrous oxide, tear gases, ether, and other chemicals. Gas is almost the sole fuel in the chemical plants producing pure molybdenum and pure tungsten. A new and important development is the production of beryllium oxide and alloying it with copper to give copper the properties of hardness and resiliency equal to that of heat-treated carbon steel. Because of its physical and chemical characteristics, it causes no sparking under abrasion and, therefore, is an all-important attribute to safety where explosive materials are processed. In certain stages of munition manufacturing, much of the explosive hazard has been removed, thanks to beryllium copper, which is prepared exclusively with natural gas.

No article of war has so intrigued the imagination as a modern tank. This movable fortress, capable of traveling at speeds of 40 to 60 miles per hour, must have great destructive-dealing qualities in offense, and yet on defense be able to resist and withstand these same agencies of destruction. Built almost entirely of metal, nearly all parts will have received some form of heat treatment by gas. The tank interior mechanisms will follow much of the accepted gas applications found in the modern tractor or automobile, although on a more extensive scale because of the greater requirements needed for meeting the more rigid specifications. But its ability to resist modern type warfare will depend upon its armor plate shell.

This armor plate must be tremendously hard on its outside surface to resist artillery fire, but its inside surface must be tough and resilient, to prevent shattering. The one fuel that makes this possible today is gas. Gas not only provides the fuel for some 15 different heating operations to which the armor plate must be subjected, but also, through chemical action of its carbon contents with the steel, it furnishes that required hard surface to a thickness approximately 10 times greater than any similar surface requirement needed in any product of commercial life today.

To approach this quality of product in the last war would have required a heating cycle from 400 to 600 hours in length. Today, thanks to the gas industry's research over the last few years, we are in a position to accomplish a far superior result in approximately 100 hours.

A Rough Estimate

A rough estimate of the amount of gas required for the many heating operations involved in the production of a tank reveal that for a medium-size tank approximately 500,000 cu. ft. of manufactured gas equivalent will be required. Since a production of 200 to 300 tanks a day is being considered to meet our requirements, the magnitude of this potential load is apparent.

The manufacture of an airplane is a continuing process of thousands of gas applications. Steel tubing for axles,

struts, motor mountings, and fuselage is necessary and of such characteristics that weight, wind resistance, etc., must be at a minimum. Through various heating operations with gas, this tubing finally goes through a modern controlled atmosphere furnace in which gas is again not only the heating medium, but also furnishes that furnace atmosphere to produce the required product — a process unknown 10 years ago — today, indispensable in aircraft manufacture.

Here, again, the cockpits and other vital parts of a plane will carry armor plate, less in thickness than the tank, but produced as before — with gas.

Propeller Production

Propeller production will require large quantities of gas, not only in their production, but in their refinement. One very recent refinement is that of molded rubber ends for propellers. This consists of taking rubber, impregnating it with nitrogen at extremely high pressures, and subjecting it to gas heat for several hours. This product is said to give better bite and better feathering action to the propeller, resulting in better plane performance.

Besides the requirements of gas for plants engaged in airplane building, enormous quantities of gas will be required by those concerns taking subcontracts on aircraft business. To indicate the enormity of sub-contracts of this type, a modern bomber will require from 400 to 600 sub-contracts for the furnishing of parts and equipment, almost all of which will utilize gas in their process of manufacture.

Large users of gas, either directly or indirectly, are those industries engaged in making naval equipment. Shipyards will require tremendous quantities of gas for shaping, annealing, and tempering the many tons of steel, copper, and other metals that go into the construction of a modern fighting ship, and also for the fabrication of the intricate piping systems ranging from ¼ in. up to 24 in. in diameter and miles in length, connecting all compartments on the decks and from stem to stern.

In these shipyards will be found gas-fired furnaces, ranging in size from an ordinary shoe box for soldering and rivet heating up to the size of a 50-room house for the annealing of a complete gun turret 50 ft. in diameter, weighing 40 tons, and operating at 1200° temperature. This operation extends over a period of 200 hours and will use over 1,000,000 cu. ft. of gas for each anneal. These furnaces are the largest in the world, and when not in use for annealing they are equipped with gas-fired unit heaters and used as a shop, believe it or not!

The *North Carolina* has three triple turrets, each mounting three 16-in. guns, and is the first capital ship built for the Navy in 19 years and the forerunner of a fleet of eight new capital battleships. Forty million cu. ft. of gas were required in the building and assembling of this ship of 35,000 tons at the Navy Yard. The keels of two 45,000-ton battleships will shortly be laid down and these will require even additional quantities of gas.

In addition to these amounts must be considered the great quantities of gas that will be needed in making the many parts and articles of equipment that go into these battleships that will be subcontracted and made elsewhere. Guns, control equipment, armor plate, and the many other necessary articles will require literally thousands of millions of cubic feet of gas in their manufacture.

In the manufacture of many types of instruments used in articles of war, accurate control of humidity is essential. Through the development of gas-designed air conditioning equipment now available, this accurate control has become a reality.

I could continue citing example after example of gas applications and the part they play in the production of material for our defense program; yet I would probably never reach the end, for each day new methods and applications are being developed and put into operation, and this will continue just so long as our industry is a progressive industry. The one big point is that with the development of radiant tube and convection heating, prepared atmospheres, and refinements in gas fuel applications and controls, gas now surpasses any heating medium in accuracy of temperature control, uniformity of heating, atmosphere control, heat distribution, and speed. These qualities are of primary importance in our national defense program. Price is of secondary importance.

In Summary

In summation, we therefore may say quite definitely that the gas industry is prepared to play and, indeed, is now actually playing a far more extensive and more important role in this program of national defense than it did in the previous war. During the 20 odd years that have intervened, we have brought to realization a program of steady and continued progress.

Then we had little to offer excepting a fuel, and many times we could not even offer that in the amounts required by a program of such magnitude. Since then, viewed from a nation-wide perspective, we have multiplied our production, transmission, and distribution facilities many, many times, to the end that practically all of our major industrial centers are adequately served.

Where we had few, if any, specialists then in the art of proper and economical utilization, we now have thousands of industrial engineers trained and experienced for the task we face. In cooperation with industry and equipment manufacturers, we have helped evolve and develop new processes and methods which, when applied to the instruments of modern warfare, make possible the superlative qualities expected for use with our modern Army, Navy, and Air Corps.

That we shall give to this program promptly, and with limitless effort, what we so clearly have to offer in service facilities and experienced training, constitutes a continuing challenge to the gas industry. With all the imaginative and creative ability of which we are capable, backed with all the initiative, enthusiasm, and determination necessary to reach our defense objectives, the American gas industry accepts this challenge!

■ ■

CALENDAR

November

American Petroleum Institute — Twenty-first Annual Meeting, Stevens Hotel, Chicago, Ill., November 11-15.

Mid-Southeastern Gas Association—Annual meeting, State College, Raleigh, N. C., November 14-15.

Mid-West Gas School and Conference — Iowa State College, Ames, Iowa, November 11-13.

December

American Gas Association and Edison Electric Institute — Joint Accounting Conference, Book-Cadillac Hotel, Detroit, Mich., December 2-4.

Fourteenth National Exposition of Power and Mechanical Engineering—Grand Central Palace, New York, December 2-7.

National Association of Railroad and Utility Commissioners — Miami, Fla., December 10-12.

National Chemical Exposition—Industrial Chemical Conference, Stevens Hotel, Chicago, Ill., Dec. 11-15.

National Industrial Council — Waldorf-Astoria Hotel, New York, N. Y., December 9-10.

Southwestern States Gas Co. Moves Sallisaw Office

The Sallisaw office of the Southwestern States Gas Co., Fort Smith, Ark., recently purchased a building for its offices there, according to Robert Winborn, district manager.

Besides a new front, the interior was redecorated and other repairs made before the company moved to its new location, Oct. 1.

RECOMMENDATIONS FOR THE CREATION OF AN

Institute of Gas Technology

By WESTBROOK STEELE

Executive Director,
Institute of Paper Chemistry

ADDRESSES given by Frank C. Smith, president of the Houston Natural Gas Co., Houston, Texas, have developed lively interest in the possibilities of research for the industries concerned with production and distribution of natural and manufactured gas. The interest grew. A committee (the Research Institute Organization Group) was formed.

The committee concerned itself with an investigation, first, of what research was presently being carried forward by the individual units of the gas industry both fundamental and applied; secondly, what research seemed to be advantageous for the gas industry. The survey disclosed that some research was being carried on, that more research was desirable, and that particularly through the extension of fundamental research, profitable outlets might be developed. Also revealed was a need for scientifically trained men.

Training Men

The scientific training of men by industry is a cumbersome process, lengthy and expensive. It is the function of technical schools or universities. But these must train on a broad basis for all industry. Individual industries naturally would prefer an educational product specifically produced to its specifications. Thus, a three-fold need became apparent: scientifically trained men, fundamental research, and an extension of applied or purely industrial research.

Such a program of training and research requires cooperation — industry on the one hand furnishing leadership, money and guidance as to the necessary qualifications to be developed through the training program and the objectives to be reached in the research and an educational institution on the other supplying the raw material, training it, and providing supervision and the hands for research.

Such a cooperative venture was undertaken in 1930 by the paper industry and the Institute of Paper Chemistry. In its 10 years of activity it has justified its program, increased the scope of its activity, and made a substantial contribution to the transition of the paper industry from an art to a science. Its success challenged the interest of the (gas industry's) committee. Its record led the committee to examine the educational facilities of the country to determine whether or not there already existed an institution whose program and facilities would lend themselves to a similar enterprise for the gas industry.

The degree-granting institutions of higher education were surveyed to determine the extent of their interest, the scope of their program, the available facilities, the institutional philosophies and their adaptability to a cooperative program. A study of the data disclosed that there was no institution presently operating on a program which could be expected to produce the desirable result. Manifestly, therefore, in order to achieve the ideal, a new institution will have to be brought into being.

This institution would have as its primary purpose the training of man power specifically for the gas industry. These men would be trained at the graduate level. The scope of the curriculum, the type of its faculty, the character of the fundamental research to be undertaken as a requirement for the degree, all would be designed to make available the highest type of trained personnel and to broaden the industry's scientific knowledge.

Such an institution would have the highest possible academic standards, necessitating a carefully selected student body. Its faculty would be recruited from men who with adequate scientific training had demonstrated their ability by practicing their specialty in industry in competition with others. Its singleness of purpose would preclude elective courses, the breadth of its program requiring an intensity of academic supervision and a higher ratio of faculty to student body than normally encountered in even the best of the country's technical schools.

There are two ways that such an institution might be brought into being. One is as an independent unit without any ties or affiliations. The other would be to establish an independent unit affiliated with an academic institution.

Ten Institutions

The information produced in the survey of the existing educational institutions indicated that there were 10 institutions which fell in this category. Officers of these institutions were contacted with the result that there were selected six which seemed most desirable. Of these, one in later discussions was not administratively interested in the program. Another was discarded without interview because of location.

The remaining four were investigated thoroughly. Their officers of administration were contacted a number of times. They visited the Institute of Paper Chemistry to examine its plant, its academic program, its research activities, its functional setup, and its policies. All were interested in the possibility of the establishment of such an institute for the gas industry in affiliation with their own institution.

It is my recommendation that an institute of gas technology be incorporated; that the Institute of Gas Technology affiliate with one of these four institutions; that the institute be incorporated under the laws of the state in which the affiliated institution is located; that it be a not-for-profit corporation; that its purposes be to establish and maintain an institution of higher learning in the United States for the instruction of students in graduate work in the various branches of a thorough and liberal education, literary and scientific, with particular reference, however, to specializing on such branches of teaching and research as pertain to the technology of gas, natural and manufactured, and the indus-

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MR. STEELE, who is executive director of the Institute of Paper Chemistry, Appleton, Wis., has prepared a report entitled "To the Research Institute Organization Group," which was available for distribution at the recent American Gas Association Convention in Atlantic City. Excerpts from this report, which are published herewith, will give an indication of the progress made by the gas industry's Research Institute Organization Group under its temporary chairman, Frank C. Smith, president of the Houston Natural Gas Corp., Houston, Texas. Mr. Steele's recommendations to the gas industry are based primarily on his pamphlet, "After Ten Years," delivered upon the Tenth Anniversary of the Institute of Paper Chemistry in May, 1940. — Editor.

tries which produce and distribute gas, natural and manufactured, and appliances therefor; that it be operated and maintained exclusively for educational and scientific purposes; that the corporation be non-stock and no dividends or profits declared to members; that the corporation be a membership corporation; that the members each have one vote and be of one class; that the membership elect a board of trustees of not less than 15 in all; that these trustees be elected for a period of three years, a part of the board being elected annually; that the management and control of the institution be vested in its board of trustees and the board of trustees elect their own officers; that the president of the affiliating institution become a member of the board of trustees; and that the affiliating institution have the power to elect two members of the board of trustees.

Since it is intended that this should be a cooperative enterprise, it is essential that the Institute of Gas Technology should retain its own entity just as it is equally important that the affiliating institution must retain its own entity. The relationship between the Institute of Gas Technology and its affiliated institution should be defined by contract. The contract should cover all matters pertaining to the affiliation including curriculum, the requirements for the granting of degrees by the affiliating institution, location, and responsibilities.

I recommend that this committee (the Research Institution Organization Group) select the incorporators of the Institute of Gas Technology; that these incorporators select the individuals who will serve as the first board of trustees; that those trustees elected be constituted a subcommittee of this committee to negotiate the contract with the affiliating institution.

The personnel of the first class to enter the gas institute is a matter of real importance. In order to get off to a good start, it will be necessary to represent the program of the institute in a clear and convincing manner to the chemistry and chemical engineering instructors and senior students of the various universities and colleges. Under normal conditions these can be contacted during the winter of the senior year before either the industries or the conventional graduate schools make their selection. For the first class entering in 1941, contacts should be made this fall and winter.

Entrance Requirements: Since so many of the problems of the industry are of an engineering nature, there is some virtue in admitting only graduates of acceptable chemical engineering courses (acceptable to the gas institute), although in certain cases unusually good graduates with majors in chemistry from outstanding liberal arts colleges and universities might be considered, particularly where their undergraduate training has included additional work in physics with such courses as mechanics, hydraulics, or thermodynamics. In any event, among the course prerequisites should be four full year courses in the basic branches of chemistry (inorganic, organic, analytical, physical), including adequate laboratory instruction and at least one full year of physics and mathematics through calculus. As an added requirement, a reading knowledge of German should be included (in some cases, it will be necessary to waive this provided the students register in the elementary course in German in the school with which the gas institute is affiliated).

Possible Types of Positions for Which the Gas Institute Must Prepare: Since the industry is made up of many thousands of small, medium, and large buyers and distributors of natural gas and manufacturers and distributors of manufactured gas and blends of natural and manufactured gas, the requirements for technical men are rather broad. Graduates of the gas institute may be used by the industry in a number of ways.

A. The smaller organizations do not and should not attempt to carry on fundamental research within their own organization, nor will there be much need for by-product studies except as these apply to small, local gas users. For many of the problems which arise the gas institute should be able to provide the answer from its accumulated experience; where the answer is not available, it may be desirable for the small company to have the work carried out on project by the institute. Consequently, a small company will use an institute graduate mainly for plant operation and the solution of problems relating to the control and improvement of the product and the lowering of costs.

B. The medium sized, independent company such as would serve an industrial area might use a gas institute graduate in the manner outlined under *A* but in addition he should be responsible for studies of the local industries and their gas requirements and possible, further, broader applications. He should be familiar with the industrial technologies of all the local industries as well as with the literature on the applications of gas technology to these industries and be in a position to adapt such applications to those industries. (It has been the experience of the Institute of Paper Chemistry that the development of this type must be initiated and carried on in large measure by the industry having the material or service to sell. The possible user will not do it until he is forced into it.)

Furthermore, the ideal gas institute graduate may be called upon to furnish technical advice of a wide nature to the operating and executive heads of the organization and his value would be further increased by his ability to provide a technical front for the company in meetings of local, state, and national technical societies. Clearly a different type of individual is indicated here than under *A*.

C. Companies in metropolitan areas and large companies serving broad areas should find gas institute graduates of value in many fields including:

1. Technical development in operating problems,
2. Operation,
3. Applied research on by-product utilization of immediate application because of local conditions,
4. Customer research,
5. Fundamental research of specific types,
6. Technical sales,
7. Technical public relations,
8. Administration, sales, and production liaison advice.

D. There will also be some demand for gas institute graduates to carry on fundamental and applied research in non-industrial laboratories serving industry, such as those of the federal and state governments (Bureau of Mines) and certain universities (Purdue, Texas, etc.), in research and consulting laboratories of allied industries on applied gas problems (Mellon, Battelle), in the gas institute itself, and in those allied industries which use gases in large volume (metallurgical, organic synthesis, etc.).

The institute should be financed for a period of not less than 10 years. All membership commitments for its support should be made for that term.

The minimum operating budget for the first year should be $100,000. A similar amount should be available as a financial foundation for each succeeding year. The initial 10-year membership contract will provide for that foundation.

The actual operating budget for each year should be determined by the administrative officers and the board of trustees.

When the institute is brought into being, adequate support for its first years must be guaranteed in order that it may be given the opportunity to justify its program and its continued existence through is production rather than its hopes.

Pipe Line Stream Crossings

By ROBERT T. KNAPP
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PART I. Types of Stream Crossings . . . Stream Characteristics . . . Flood Characteristics of Alluvial Streams

THE design of stream crossings for pipe lines appears to have been a rather controversial engineering topic in the gas and oil industry for some time. This is quite natural since pipe lines are such a vital link in the transportation of the petroleum. A stream crossing on such a pipe line is always a potential source of trouble, and many of the designs adopted have not proved to be as satisfactory as it was hoped they would be. Therefore, it is little wonder that there should be quite a divergence of opinions still in existence concerning best methods of design of these vital structures. The purpose of this paper is to present still another discussion of this subject for your consideration, this time from the viewpoint of an engineer outside of the industry. It is built up primarily from the basic concepts of mechanics and hydrodynamics together with what empirical information could be obtained upon the previous behavior of various types of pipe line crossings.

I. *Types of Stream Pipe Line Crossings*

There are three general types of pipe line stream crossings. The first one is the one in which the pipe and its supports are kept completely above the high-water mark. A typical example of this would be the suspension bridge with a tower on each bank. The second type is the one in which the pipe line itself is supported above the stream but the piers which support it are exposed to the stream and are anchored in the stream bed. The third type is the buried crossing in which the pipe line is buried in the stream bed presumably below the depth to which the stream scours during flood. Each of these types has subdivisions, some of which will be discussed later.

R. T. KNAPP

PRESENTED on these pages is the first of a series of three articles by Professor Knapp on the topic of Pipe Line Stream Crossings. This paper was first presented before the Spring Technical Conference of the Pacific Coast Gas Association, held in Los Angeles, April 11 and 12, 1940. Professor Knapp received his B. S. from the Massachusetts Institute of Technology in 1920; his Ph. D. from the California Institute of Technology in 1929. He has been consultant for the Metropolitan Water District of Southern California (1934-1936); collaborator, Soil Conservation Service, U. S. Department of Agriculture (1935-1936), and at the present time is associate professor of hydraulic engineering at the California Institute of Technology. — Editor.

II. *Stream Characteristics*

The kind of crossing selected determines the type of structure to be designed. However, the characteristics of the stream determine the forces that it must withstand. Therefore, before going any farther into the specific designs, it is desirable to investigate the general behavior of streams. If a given stream is considered from a long time viewpoint it may be classified as an agrading, a degrading, or a graded stream. This classification is not as useful as it first seems because the processes involved may have such a slow rate of change as to be insignificant in the lifetime of the pipe line. Characteristics of much more importance are the type of bed, whether solid or alluvial, the type and amount of debris load transported by the stream, and the probable magnitudes of the floods which are to be expected in the region. The design of stream crossings for locations having solid beds and banks is a relatively simple problem and needs no discussion here. Therefore, the following comments deal with streams in alluvial terrain.

Streams have many characteristics, some of which are and some are not pertinent to the design of pipe line crossings. Therefore in order to limit the discussion to the former it is well to consider briefly stream factors that

would affect the design of suspensions, piers, and buried crossings.

For a suspension crossing that does not employ piers in the stream the principal hydraulic factors influencing the design would be:

1. Maximum high water level.
2. Maximum active scour width.
3. Limits of probable side scour that might undermine towers.
4. Possibility of flooding of areas surrounding tower, anchors, and pipe line approaches.

These are, of course, in addition to the normal questions of allowable soil loads, etc.

The corresponding hydraulic factors for a buried crossing are:

1. Maximum depth of scour during flood.
2. Maximum velocity of flow (a) average for section (b) value near bottom.
3. Maximum effective density of water plus debris load.
4. Limits of probable side scour.
5. Location of possible high velocity channels.
6. Danger of accumulating debris.

In addition to the above, crossings of either type that employ piers have the following hydraulic factors which demand consideration:

1. Depth of induced scour above and below pier.
2. Forces caused by hydraulic interference between piers and pipe line.

With these factors in mind the flood behavior of streams having alluvial beds may be scrutinized.

III. *Flood Characteristics of Alluvial Streams*

A. *Flood Magnitudes:* The most important of all of the stream characteristics is the magnitude of the floods which are liable to occur. There are two main sources of information which can be used as bases of estimating the magnitude: the past records of stream-flow, and general meteorological data for the watershed and adjoining territory. Here the specific information is apt to be much less reliable and conservative than the generalizations of the meteorologists and the allied engineers in such organizations as Flood Control Districts. Stream flow records for a given location are apt to be discontinuous and cover relatively short periods of time. The meteorological generalizations, on the other hand, represent not only the combined experience of the region, but also take into consideration the possible intensities and duration of rainfall, storm sources, and other factors.

The writer feels that at the present time the most satisfactory way of estimating possible flood magnitudes is on the basis of the size of the watershed, and the meteorological characteristics of the region. Unfortunately for the estimator the size of the possible flood does not vary linearly with the extent of the watershed. Due to the diversity of rainfall intensities over large areas and to the time necessary for the runoff to collect the rate of flow to be expected per square mile is less for the larger watersheds than for the smaller.

As an example of these various factors, consider the region in Southern California lying between the Santa Clara and the Santa Ana drainages. On the average for the large watersheds it is felt that a maximum value of 500 second-feet per square mile should be used in estimating flood peaks, increasing to twice this unit contribution for watersheds of only a few square miles. On the basis of past records, these values appear to be high for the Santa Clara watershed, although they have been shown to be about right for the San Gabriel. However, the best meteorological opinion takes the stand that the probability of high intensity storms in the Santa Clara Valley is great enough to justify these figures.

B. *Debris Load:* In the past it has often been tacitly assumed that the flood problems of Southern California, and for that matter of most any region, consist of controlling the flow of storm waters. The storm of March, 1938, adequately demonstrated that at least for the southwest this is the smallest part of the problem. The major difficulty is the control of the debris load carried by the flood. During this storm it was demonstrated repeatedly that the debris-laden flow was a case of dynamic equilibrium and that anything that disturbed this equilibrium would change the amount of material that the stream would carry. Obstructions which decreased the velocity of flow caused immediate deposition. Increase in gradient induced extreme scour. Even minor alterations of natural channel conditions produced unexpected results. These demonstrations are pertinent to the problem of designing pipe line crossings.

(1) *Debris Quantity:* One of the first questions that arises in dealing with debris-laden flow is, what is the amount of the debris (silt, sand, rocks etc.) that can be transported? Unfortunately, there is very little actual knowledge available at present upon which to base a quantitative answer, especially for the case of the high velocity stream common in southern California and similar areas, which are characterized by rather steep slopes. However, some well substantiated observations indicate that concentration as high as 50% by volume* is possible. This means that mixture weights of 90 to 110 lbs. per cu. ft. may be encountered. This debris concentration is not uniform throughout the stream, but varies with the vertical position, being highest near the bottom and lowest in the upper layers of the flow. Fortunately for buried pipe lines, the velocity varies in the opposite manner, being the minimum at the bottom of the stream.

(2) *Size of Debris Particles:* The maximum size of material that a given stream can transport is also difficult to predict. Any loose material, no matter how large, found in the stream bed has been transported by the flow unless its local origin is obvious. Usually the larger pieces of debris are buried in a bed of finer gravel and

*No consistency exists in the methods used to measure sediment suspension concentration. In this paper percent by volume means the percent of the volume of the mixture that is actually occupied by the solid material, and does not include the volume of the voids which would exist in the dry state.

sand deposited by falling flood waters or by normal flow. Therefore, the surface material may be considered to indicate only the lower sizes that can be transported by the stream.

C. *Behavior of Alluvial Stream Beds During Flood:* From the point of view of pipe line crossings, one of the most serious characteristics of flood flows is the ability to scour the bed and banks of the stream. Since bottom and side scour are quite different in mechanism and result, they will be considered separately.

(1) *Bottom Scour:* Bottom scour is a phenomenon which often escapes detection and eludes evaluation because of its transitory nature. During normal stream flow comparatively little bottom material is in motion. As the stream rises to flood stages the velocity and depth increases, and when the tractive force due to these factors exceeds the friction resistance of the bed material, large scale movement begins. By this time the flood waters are opaque and thus this bed movement, or scour, is not visible. It rapidly increases in magnitude, however, with the rising flood, but when the velocity finally decreases, the bed movement also decreases, and may cease altogether before the water is clear enough to observe the bottom. In most cases conditions are so balanced that the final elevation is about the same as it was initially, thus giving the impression that there was no appreciable bed movement during the flood. The fallacy of this conclusion is seen when the damage to bridge piers, transmission line towers, and pipe line crossings is analyzed.

(2) *Depth of Bottom Scour:* For a given slope of a stream bed, the depth of scour during flood depends chiefly on the magnitude of the flood and the size of the bed materials. The more uniform and the smaller the size of the individual particles making up the bed, the deeper will be the scour for a given velocity. Some evidence also indicates that high concentration of silt and clay in the suspended load may also increase the transportation power of the stream, and thus the depth of the scour. Conversely, if the size of the bed material increases quite rapidly with the depth, a lesser depth of scour will be expected. Information concerning the size of the bed material with depth is not readily obtainable. Single samples may give a qualitative picture of bed condition but are of little quantitative value since wide local variations are quite characteristic. Experience indicates that alluvial streams in flood may be expected to scour the bottom to a depth of from one-half to twice the nominal water depth, both measurements using the normal or low flow bed elevation as the datum.

In this connection, a generalization of the effects of the flood that occured in Southern California in March, 1938, is very significant. In the main streams in Los Angeles and adjoining counties it was observed that the majority of the structures in the stream beds that had foundations of 5 ft. or less in depth were destroyed or severely damaged, those with foundations between 5 and 15 ft. suffered less but still experienced some major damage, while those with foundations deeper than 20 ft. came through the flood practically unscathed.

(3) *Side Scour:* Side scour differs from bottom scour in several significant features. In general it is more visible and more permanent. It is usually local in character instead of occurring along the entire channel. Deep bottom scour may induce side scour by removing the bank support and thus causing caving to take place. Also casual local obstructions, such as debris dams, may produce severe local scour. However, in the majority of cases side scour is a phenomenon accompanying the receding flood. As the flow lessens, the capacity for transporting debris decreases. Deposition then starts to take place in the zones of minimum velocity, thus producing bars. If this deposition decreases the channel capacity at a faster rate than the flow decreases, the high velocity filaments are forced against the opposite bank, where they scour until equilibrium is again reached. Side scour may be produced similarly in the lower reaches of a stream where the gradient is small, if the upstream conditions change so as to yield an abnormal debris load.

(4) *Conditions of Watershed:* This last remark is an implicit statement of the fact that the behavior of a given stream depends not only upon the gradient, the character of the bed, and the amount and intensity of the precipitation, but also on changes in the surface cover of the watershed. This was demonstrated very clearly in the New Year's flood of 1934, which caused such extreme damage in the Montrose - La Crescenta districts in Southern California. This damage was not due primarily to high rates of flow but rather was caused by the tremendous increase in debris load from the mountains. A fire had burned over this area the preceding fall, removing the protective cover and leaving the soil in an erodable state.

D. *Prediction of Stream Behavior:* From the above discussion it is seen that an exact prediction of the future behavior of a particular stream is impossible, due to the number of uncontrollable variables which govern this behavior. Nevertheless, if pipe line crossings are to be designed and built, it is necessary to estimate this behavior. It is the writer's belief that when pipe lines of major importance are involved, these estimates should be pessimistic, since losses due to service interruptions plus the cost of replacement of inadequate installations will far exceed the initial cost of a crossing with an adequate factor of safety.

(This is the first in a series of three articles by Mr. Knapp on "Pipe Line Stream Crossings." The second article, to appear in GAS for December, will cover "Detailed Design Factors.")

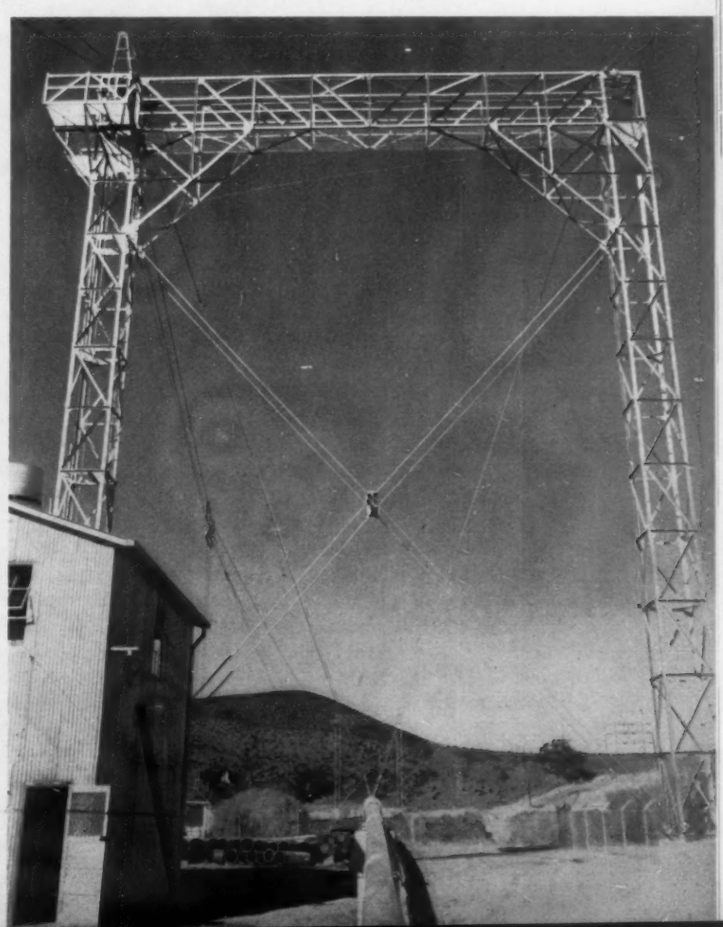

FIG. 1.

Pilot plant constructed at the Cornwell Station of the Hope Natural Gas Co.

By
J. A. CLARK
and
R. W. MILLER

The Liquefaction, Storage, and Regasification OF NATURAL GAS

THE problem of how to meet peak-load demands in the gas industry has been pertinent to gas executives and engineers for many years. In the manufactured gas industry, when consumption exceeds the capacity of gas-making equipment, it usually has been possible to draw reserve supplies from low pressure gas-holders, well located in the distribution system. When demand slackens, the excess of gas produced over that required by consumers can be stored for some time in the aforementioned gas-holders, to be subsequently withdrawn as occasion requires. Such procedure has become standard practice, and indeed serves as an insurance feature to those responsible for continuous service to the public.

Natural gas companies have experienced greater difficulties in solving peak-load demand problems than those utilities distributing manufactured gas. The reason thereof is immediately apparent when one considers, first, the great distance generally existing between the source of natural gas supply and the consuming center, and second, the fact that the two must be joined by a pipe line system sufficient in size to deliver an adequate supply of fuel for customer use at all times.

In the northern states, during the warmer months, the pipe line system operates at only part of its capacity, result being that many wells are shut in at that time and various compressing units are inoperative. The system is not called upon to deliver the amount of natural gas for which it was designed until on the coldest days of the winter, when all available wells are turned into the gathering lines and all compressors are in use. If the cold spell is prolonged or extremely severe for three or four days, customer demand may equal or even exceed the capacity of the system to deliver. It is then that some extra gas, available from nearby storage, would indeed prove a boon to the utility.

Adequate storage of natural gas, however, presents a somewhat complicated picture, attended by difficulties which have not been easy of solution. Low pressure natural gas-holders located in proximity to gas consuming centers have never been extensively used, principally on account of the fact that for natural gas, their capacities are limited and their cost prohibitive. This situation exists due to the fact that the natural gas load is extremely variable, caused principally by a high percentage of that load coming from house heating, which is directly dependent on the weather.

The manufactured gas industry has been able to correct this variable load curve by the use of large gas-holders, but the natural gas industry has always handled quantities of gas too large to make the same method practicable. Industrial and commercial demands are not greatly affected by extremely low temperatures, but as those demands always exist, irrespective of climatic conditions, same must be satisfied, even at a time when human comfort appears of paramount importance.

Generally speaking, the pipe line has been the gas-holder of the natural gas utility. In former times, natural gas has been stored in the pipe line by the simple expedient of raising pressures therein during the night to the limits allowable, if necessary, so that the gas thus stored could be available on the following day, when demand arose, which, if severe, may exceed for several hours the capacity of the entire system, as shown by continuous main line pressure drops. Such pipe line storage as described is indeed helpful to the operating personnel, but it has become increasingly evident to them that such a method is not entirely successful under all conditions, and must be supplemented or augmented by storage more adjacent to the city gates.

At least one gas company has attempted the solution of its storage problem by the installation of high pressure tanks at the edge of the consuming center. Natural gas from the pipe line is pumped into these tanks at off-peak times, to be removed there-

from when needed. As with the low pressure gas-holders, we believe the cost of high pressure storage to be excessive, if large volumes of natural gas are involved.

Other natural gas companies have very successfully stored natural gas underground, making use of depleted gas fields, into whose gas sands have been pumped large volumes of natural gas in the summer months when the pipe line system was not being operated to capacity. Obviously, a compressing station is required for such an operation, as field storage pressure soon exceeds pipe line pressure. Also, the control of all leases is necessary.

Problems Solved

Such procedure not only may completely solve the peak-demand problem, but it also contributes to less seasonal pipe line operation, allowing larger volumes of natural gas to be handled in the warmer months. If the natural gas utility is so fortunate as to have its underground storage within a few miles of the consuming center and to have sufficient capacity therein for all emergencies, the situation may be considered well-nigh ideal, and the necessity of capital investment for additional pipe line facilities is obviated. If the storage pool is available on the pipe line at a point three-fourths of the distance to the city, or even one-half, natural gas can be transported from the extreme end of the line in the summer and stored for future use.

It can be seen from the foregoing that adequate natural gas storage adjacent to certain cities has become a problem to the natural gas industry, urgently in need of attention. Some type of storage was needed wherein the necessity of high pressures could be removed, the use of large containers rendered unnecessary, and the concentration of the maximum number of cubic feet of natural gas in the minimum space accomplished. We believed that by the liquefaction of natural gas, all of the foregoing requirements could be satisfied.

This belief was influenced to a great extent by the activities of the U. S. Bureau of Mines, first at Fort Worth, Texas, and later at Amarillo, Texas, where natural gas was liquefied in the process of helium production. Natural gas liquefaction was an accomplished fact, but we were faced with its storage, whereas the Bureau regasified the liquid immediately following helium extraction. We were intrigued to the greatest extent by the fact that 1 cu. ft. of liquid natural gas at atmospheric pressure will produce approximately 600 cu. ft. of free gas at ordinary temperature.

Late in August, 1937, we began an intensive study of natural gas liquefaction, its storage, and subsequent regasification. It was felt by all that the liquefaction of the natural gas itself presented no unsurmountable difficulties, as proven by the U. S. Bureau of Mines work already mentioned. The basic problem was to remove heat from the gas down to its boiling point at atmospheric pressure, and to reject it in some fashion to cooling water of approximately 60°. However, the storage of liquefied natural gas, whose boiling point is from —250° to —258° F., dependent upon composition, was the chief difficulty, entailing as it does the use of (1) special metal tanks, which would not shatter at the low temperature mentioned, and (2) some special type of insulation around the tanks which would prevent the too rapid infiltration of heat through the tanks and into the liquid gas, causing such excessive evaporation as to render the project not only unfeasible but economically prohibitive.

Regasification following storage appeared not too difficult of attainment, although methods of handling the liquid at the low temperature caused some misgivings. It was believed, once the problem of liquefaction, storage and regasification of natural gas was solved, that it would be relatively simple to adapt the entire operation to the low pressure distribution phase of a natural gas utility.

The plan called for the liquefaction of the natural gas at the edge of the city, using gas taken from the pipe line during the months of September, October, and November, when the system was not taxed to its capacity. The liquefied natural gas would be stored in special insulated tanks, to be withdrawn therefrom and regasified when need arose. It was realized that some gas would evaporate daily from the storage tanks, as some heat infiltration would always occur. This gas could either be reliquefied, or if the liquefaction plant was shut down on account of storage being filled, it could be fed directly into the city mains.

During some extreme period of low atmospheric temperatures, quite a volume of liquid gas would be removed from the storage tanks. This could be replenished, as experience has taught that there are many mild winter days, when the natural gas pipe line system is not taxed to capacity and gas can be withdrawn therefrom for liquefaction and storage. At the end of the winter season, whatever liquid gas remained in the storage tanks could be allowed to evaporate at will into the distribution system. The plant would then be idle until the following September.

Laboratory Experiments

Experiments were made in the laboratory with a small tank, covered with 3 ft. of block insulation, in which thermocouples were installed at 6-in. intervals for temperature measurement. This tank was filled with liquid nitrogen, and refilled at intervals, over quite a few days, in order to attain a temperature equilibrium. From the amount of nitrogen evaporated and from the thermocouple readings, valuable information was secured as to heat infiltration and as to types and thicknesses of insulation. Also, the behavior of various metals under these low temperatures was studied.

Finally, after considerable laboratory work and research, the choice of design for a liquefaction plant narrowed down to two methods. The first made use of an expansion engine, taking work out of high pressure gas and exhausting this gas at a very low temperature, which could be utilized as a cooling medium for the high pressure gas to be condensed. The second employed the so-called cascade system of removing heat in steps through the medium of three or four circuits, each using a different gas which would liquefy at successively lower temperatures and by exchanging heat between the circuits. Both ideas were workable, but the cascade idea was adopted.

By September, 1939, research work had progressed sufficiently far in the laboratory to warrant the erection of

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THE AUTHORS

DR. MILLER received his M.S. Degree from Kansas State College in 1915; his Ph.D. from Pittsburgh in 1917. He was an assistant at the Mellon Institute from 1915 to 1917; a Fellow from 1919 to 1921. At the present time he is Senior Fellow on Natural Gas Research at the Mellon Institute of Industrial Research, and research director for the Hope and Peoples Natural Gas Companies, Pittsburgh, Pa.

MR. CLARK was graduated from Cornell University in 1910 as Mechanical Engineer. After six years' service as meter engineer on construction projects, he served nine months with the United States Army 156th Engineers. He has had 15 years' experience in the supervision, construction, and operation of compressing stations, has been assistant general superintendent of the Hope Natural Gas Co. for five years; at present is chief engineer in charge of gas transportation.

This paper, "Liquefaction Storage and Regasification of Natural Gas," was presented by Messrs. Clark and Miller before the 22nd Annual Convention of the American Gas Association, Atlantic City, New Jersey, October 7-10, 1940. — Editor.

a pilot plant (Fig. 1) wherein relatively large quantities of natural gas could be liquefied, stored, and regasified, making use in a practical way of the methods developed on a small scale, and whereby certain preconceived ideas could be tried out for the first time. We were interested in:

1. The actual performance at low temperatures of certain alloy steel tanks.
2. The type of insulation and its thickness.
3. The evaporation rate of liquid natural gas.
4. A method of handling whatever nitrogen was present in the gas and which would not be liquefied.
5. Methods of water vapor and carbon dioxide removal.
6. Regasification.

Pilot Plant Erected

The pilot plant was erected at our Cornwell Station and was designed to condense to a liquid 400 M c.f. of natural gas per day, using three cascade steps. For the first step, ammonia boiling at — 27° F. and isobutane boiling at + 11° F. were considered, while ethane with a boiling point of — 129° F., and ethylene, boiling point — 152° F., were given consideration for the second step. The choice of ethane and isobutane would have been ideal, for all make-up could have been secured by fractionation of the liquefied natural gas. But as their temperatures did not work out so satisfactorily, ammonia and ethylene were chosen.

It was realized that early in the temperature drop, water and carbon dioxide would solidify and completely plug the tubes, so that they had to be removed at the very start of the process. For this, a scrubbing plant using mono-thanolamine and diethylene-glycol was first introduced, followed by two tanks filled with granulated aluminum oxide to remove the water vapor.

For storage, we used a horizontal symmetrical tank 10 ft. in diameter by 18 ft. long, holding 14,500 gals., equivalent to about 1000 M c.f. of gas. This was made of alloy steel plates and was covered with 2 ft. of formed cork, cemented on and water-proofed with bituminous tar. At the Cornwell Station, large quantities of 800- to 900-lb. gas, dehydrated to 30° F., were available, and also about 400 hp. of ammonia refrigeration. For the upper temperatures, conventional pipe and fittings designs for the various pressures were used, but as soon as — 50° F. was reached, all pipes, valves, exchangers, etc., were made of either pure copper or stainless steel.

The plant was completed and put into operation the middle of January, 1940. It took about four days running to chill all of the material before we began to get liquid gas, and then a three-day run gave us our first tank — 90% full. We then shut the engines down and let this tank stand to get the rate of heat infiltration and we found a daily evaporation of about 28 M c.f. of free gas. Later, we built several evaporators and finally developed a design so that we could evaporate the liquid as fast as it was condensed, allowing us to run constantly for several weeks at a time and get actual operating conditions and data.

We arrived at the following conclusions from the operation of the pilot plant:

1. The last possible traces of water and carbon dioxide must be removed, as failure to hold up the amine concentration at one time caused a two-day shutdown due to plugging with carbon dioxide ice.

2. There is a continual increase in the per cent of nitrogen, oxygen or any other gas noncondensible at the low temperature and these must be continually removed. We found that a surge tank, inserted in the gas line just after the ethylene condenser, where the gas is a liquid at 600 lbs., with a bleeder to the engine fuel line solved this problem.

3. After going below — 50° F., the pipe and tank steel becomes so brittle it is entirely unsafe. The metals which retain a safe Charpy impact test value are, in the order of excellence, pure copper, bronze, Monel-metal, red brass, stainless steel and steel plate with carbon content less than .09% and nickel over 3½%.

4. The best heat insulator we have found so far is cork, although something better may be discovered later. Formed cork was used on the pilot tank, but we found that loose granulated cork between two walls gave still better results and was much cheaper. However, this must be kept perfectly dry to function properly. We have found a conservative coefficient of heat transfer in B.t.u. per square foot per inch of thickness per degree F. per hour to be .40.

5. The evaporated liquid has exactly the same analysis as the raw gas used as feed. However, the evaporation from the stored liquid is entirely methane and eventually, if allowed to stand for long periods, the liquid left will become increasingly higher in ethane plus content.

6. At — 250° F., the molecular activity of the liquid is so low that it is an excellent insulator for itself, and to transfer heat into it the liquid must be broken up into very thin layers and its velocity must be kept very high and turbulent.

After operating the pilot plant almost constantly for four months, it was found that practically all questions had been answered, and it was shut down and has since been dismantled.

Very shortly, however, an opportunity presented itself to use the knowledge gained in these experiments. The city of Cleveland is supplied with natural gas principally through four 20-in. and 18-in. lines from the Hastings Station of the Hope Natural Gas Co., 150 miles distant.

Winter Problems

During January, 1940, the cold waves which hit every gas company in the East made it very difficult to keep the supply ample, and by spring, it was felt that something would have to be done to augment the available supply. Plans already made called for an extension of a 12-in. high pressure line to the city limits at a cost of approximately $2,500,000. However, after reviewing the work done at Cornwell and the plans and estimates based on these results, the officials of the gas companies involved decided that they could secure the same results by building a liquid storage plant at a cost of roughly $750,000, and authority was given by them to go ahead with the plans. It is expected that this plant will be ready to operate by late fall, so that operations can be started and the storage filled by Christmas, making it available for this winter's peaks.

This plant, which is shown diagrammatically on the accompanying flow sheet (Fig. 2), will be able to condense 4000 M c.f. of gas per day and will have three storage tanks, each of 600,000 gals. capacity, equal to 50,000 M c.f. of free gas, or a total storage of 150,000 M c.f. The evaprators, which are steam heated, have a capacity to regasify 3000 M c.f. per hour.

The feed gas will enter the plant from a city belt line at 30 lbs. gage, and will be compressed by a 600-hp. engine to 600 lbs. gage, then going through the scrubbing plant to remove all water and carbon dioxide, after which it goes to the ethylene exchangers with high pressure gas on the inside and boiling ethylene on the outside, thereby chilling the gas to — 126° F., and reducing it to a liquid. After further chilling in the two flash gas exchangers to — 139° F., it is cracked through the first expansion valve into

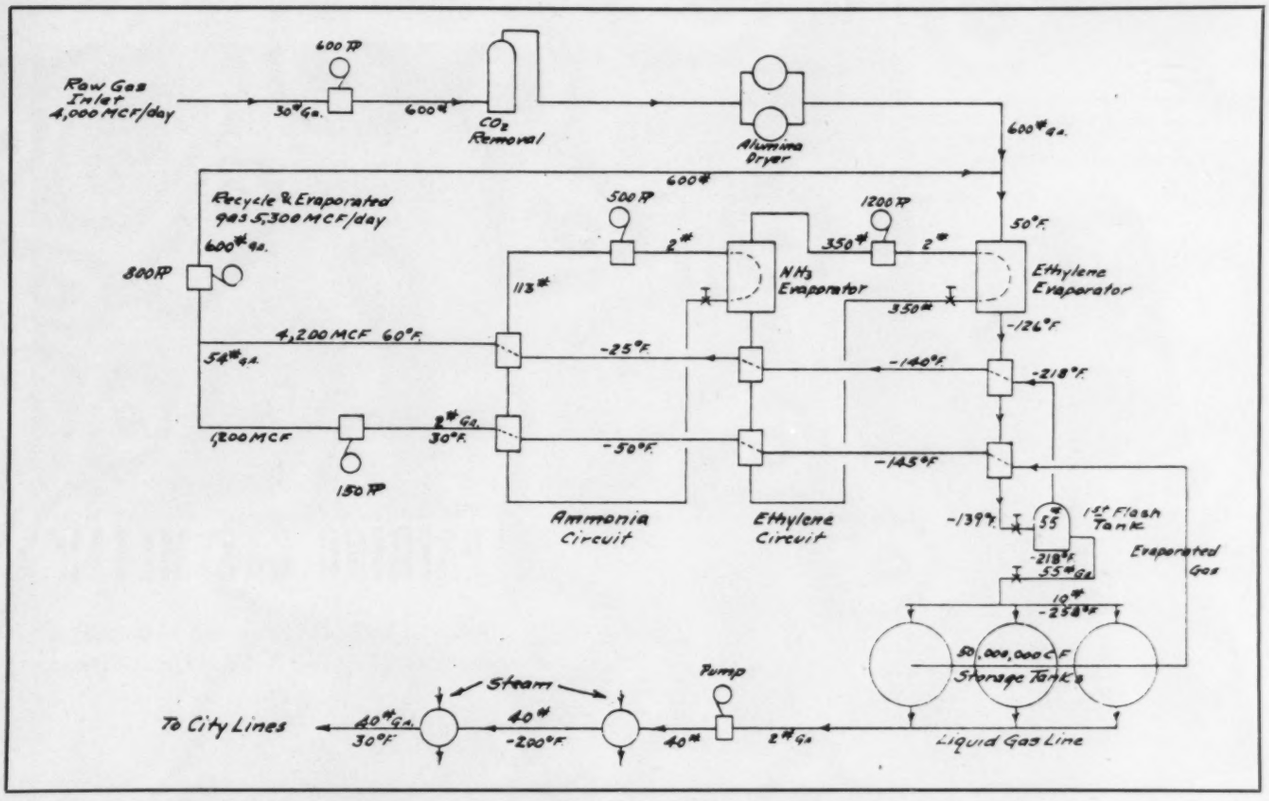


FIG 2. Flow diagram showing the main details of the Cleveland Plant now under construction.

the first expansion tank at a pressure of 55 lbs. gage. Here, about half of it remains as a liquid, and the remainder goes back to be recompressed and processed over again. The liquid from this tank is then cracked through the second expansion valve directly into the main storage tanks at a pressure of 8 lbs. gage, about 85% of it remaining as a liquid for storage, and 15% going into gas and being recompressed for further treatment.

The evaporated gas from the second stage, after passing through heat exchangers, is picked up and compressed to 55 lbs. gage by a 150-hp. compressor. Here it joins the evaporated gas from the first stage cracking, and the combined stream is taken by an 800-hp. engine and boosted to 600 lbs. gage, being then put back into the raw gas feed stream. This evaporated gas is practically pure methane.

The ethylene is contained in a closed circuit, where it is compressed, using 1200 hp. at the flowing rate of 7000 M c.f. per day up to 340 lbs. gage, and then is cracked through an expansion valve to 5 lbs. gage, reducing the temperature to — 145° F., which is used to condense the high pressure gas.

The ammonia is also in a closed circuit, flowing at the rate of 3750 M c.f. per day, and compressed by a 500-hp. engine to 113 lbs. gage, and then expanded through a valve to 3 lbs. gage, reducing the temperature to — 20° F., which is used to condense the high pressure ethylene.

The storage tanks themselves are two concentric spheres separated by 3 ft. of cork insulation, formed in the lower half, to carry the load of the inner tank and its contents, and granulated in the upper half. The outer sphere is 60 ft. in diameter, made of tank steel and carried by legs down to a concrete footing. The inner tank is 54 ft. in diameter and supported entirely on the cork surrounding it. This tank is made of special steel with a .09% carbon and 3½% nickel content, and is of all-welded construction. In developing the welding technique, over 200 welding rods were tried to get one which would give a weld with a satisfactory Charpy impact test at — 310° F., the temperature of liquid nitrogen, and the one finally selected was high in nickel and chromium.

The evaporation equipment consists of three pumps that pick up the liquid from the tanks and raise its pressure to about 40 lbs. gage, the city belt line pressure. The gas goes to a two-stage heat exchanger with gas on the inside of the tubes and steam on the outside. There was already installed on the plant site 1400 hp. of boilers which required only reconditioning to be put into service. The first-stage heater has double tubes, the liquid passing first through a ¾-in. tube and then back between it and a 1-in. tube, exposing a very thin high velocity stream to the heat. Thereby is added the heat of vaporization and the gas leaves at about — 200° F. From the steam heater it goes to a final four-pass gas heater, where its temperature is raised to about 30° F. before being passed through meters to the distribution lines.

The remainder of the plant consists of conventional water cooling towers, water pumps, air compressors, and the other usual appliances of a gas compressing station. All gas connections for normal temperatures are Van Stone on seamless steel pipe and ring joint gaskets. But any line carrying gas or liquid colder than — 50° F. is made of copper tubing with Van Stone joints, using bronze flanges and bolts. At every point possible, automatic controls have been used to regulate pressure, temperature, volume, or engine speed so that the finished plant will have a minimum of manual supervision. Being in the heart of a large city, noise would be very objectional, so all intakes and exhausts have been equipped with best mufflers possible.

Construction is now well along on this plant, and it will probably go into service before the first of the year.

1. Right: Ivan Anderson, assistant superintendent, checks over some of the neatly piled meters awaiting the initial power test.

REPAIRING GAS METERS

A Pictorial Trip Through the Meter Shop of Peoples Gas Light & Coke Co., Chicago

2. Top Left: A meter repair tag is attached to the meter during the proving process. The condition of the meter is carefully recorded on the card by Robert Burns, prover.

3. Above: Mr. Burns is entering the dial recording on the meter repair tag during a test. The upper portion of the tag remains with the meter during the adjustment or repair operations; the lower portion goes to the Bookkeeping section for recording.

4. Above: Assuming that a meter is to be dismantled for general repair, it goes to a stripping bench where the outside cover is removed. Sam Brunetti has just applied a soldering iron to the side of the meter in removing the back cover for an examination.

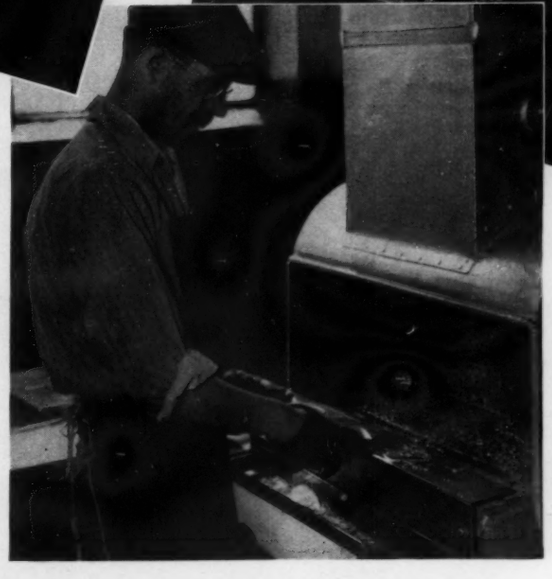
5. Left: Meters are sorted according to the prover's recommendations. Gus Scheck is unloading the meter truck, placing them in piles according to the kind of work that has been scheduled to be done on each meter.

6. Left: The diaphragm on this meter interior is in good working order, so Frank Garafola injects a special oil preparation into the leather "lungs" or diaphragm so as to close the pores of the leather and make it more pliable. The oil is applied through the valve ports to insure complete lubrication.

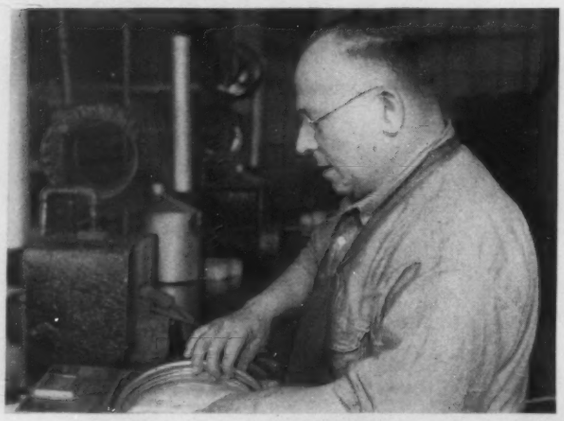
7. Left: After oiling, each diaphragm is checked under pressure to make sure that it is leak-proof. Bernardo Niccassio is watching the leak indicator gage during the tell-tale pressure test.

8. Above: A basketful of meter covers is "doused" into a hot tank of oakite which thoroughly cleans them. Tom Galvin has just raised the chain hoist from the tank with a steaming cargo of cleaned covers.

9. Right: Covers also receive a thin coat of solder by the dipping method. Nick Costantino starts the coating by dipping the four edges of the metal into the molten lead.



10. Above: "Tinning" is the beginning of the assembly operation. Al Stewart is busy with hot irons melting excess solder from the parts, and leaving a smooth thin layer of solder on them for attaching or "sweating" on various other parts of the meter.



Accuracy is the by-word in the Meter Shop of The Peoples Gas Light & Coke Co., where once every seven years each gas measuring device is brought to be proved, tested, inspected, adjusted, or repaired.

11. Above: The oil treated leather "lungs" or diaphragms with metal rims attached, are inserted into the meter case by Peter Martini. The inside portion of the rim is soldered to the inside of the meter, while the outside rim is fastened to a metal disk. When the process is completed the unit has the action and appearance of a bellows.

12. Left: Before replacing the front and back on a meter it is necessary that the edges are straight. Nick Stevens uses a folding machine to accomplish the task. A stack of covers nearby is awaiting the straightening operation.

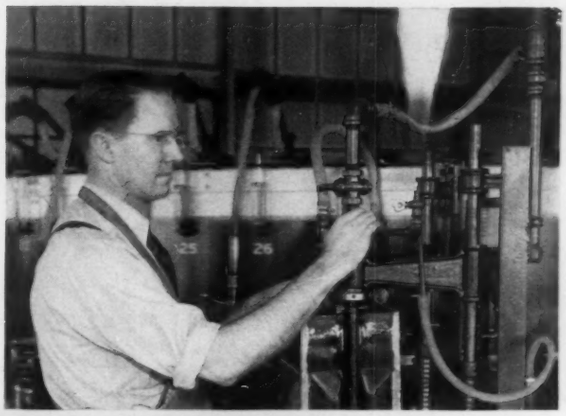
13. Left: The diaphragms are fastened in air tight, and Frank Lucatoto has just completed soldering on the back. He is taking extra precautions with the cover to prevent leaks.

15. Below: Indexes or dials are removed from the meters, cleaned, repaired, and set at zero. Elmer Keiner washes the index so it will be clean and operate properly.

14. Right: The top compartment of the meter containing levers and gears which motivate the dials, is sealed against the lower part of the meter. Grease covered packing on one of the levers is being expertly removed by Albert Mitchell.

ACKNOWLEDGMENT

To The Peoples Gas Light & Coke Co., to Clayton Cassidy, advertising manager, and to Charles Morse, editor of "Gas News," the company's Employe Magazine, GAS extends hearty thanks for the cooperation which has made the publication of this educational sequence possible. This pictorial trip through the Meter Shop of the Chicago utility will be continued in the December issue of GAS.



19. **Right:** The meter case must be leakproof. The water basin having a submerged light detects any small bubbles emerging from the meter as Frank Ublasi holds it under. This test is made before the top cover is installed.

20. **Above:** A spectacular flame shoots up as the gas is burned off so as to detect any leaks between the compartments of the meter. If the flame does not die off within a short time, it is evident that the compartment inside requires checking. Harry Bundy regulates the gas valves.

18. **Right:** The meter table in the picture holds 48 meters, and revolves once an hour. It is used to check leaks in the soldering in the exterior case of the meter by subjecting each one to 1½ lbs. pressure. The machine was developed in The Peoples Gas Light & Coke meter shop.

16. **Below:** Elmer Keiner is reparing the index already set at zero. These dials are kept in order during the repairing operation so as to make certain the same index goes back in the same meter.

17. **Left:** Tom Fitzmaurice is installing a "triangle" which transfers the bellows action of the meter into even revolutions of the small worm gear, which, in turn, revolves the meter dials.

In this general view of Boys Town, the dining room is in the foreground. Just behind it to the left is the administration and gymnasium building. The large building in the center with the gabled roof originally housed all the activities of the Town. It is now devoted to classrooms. In the background are the dairy buildings, and on the extreme right is the postoffice. Behind the postoffice, partially concealed by trees, is the residence of Father Flanagan.

Natural Gas Comes to Boys Town

THE Northern Natural Gas Co., of Omaha, Neb., recently completed 11 miles of 6-in. and 4-in. pipe from Ralston to Boys Town, Neb., and gas service was started October 20, according to an announcement from H. J. Carson, vice president of the Northern Natural Gas Co.

The cost of the line and measuring station was between $40,000 and $50,000 and was borne by the company.

Natural gas at Father Flanagan's home for boys is used in the central heating plant, cooking, pasteurizing milk, various uses in the print and work shops, and for other general uses. Maximum demand is about 25,000 cu. ft. per hour.

Oil was formerly used for heating and butane gas for other uses by the 280 boys now at the institution.

The rate agreed upon will be a special combination price, dropping as consumption increases. Cooking gas will be furnished in a constant supply, while heating fuel is to be bought on an interruptable basis, which affords a cheaper rate and maintenance of standby oil burners.

Father Edward J. Flanagan started aiding homeless harvest hands that flocked to that country in the autumn of 1913, but after three years of housing men, at times as many as 500 in a single night, he decided his work had not been successful because the type of men who applied for help were mostly drunkards and dope fiends, men with prison records and men who were not only far from seeking work, were avoiding it and had passed the stage where deep character changes might be effected.

He decided to take wandering boys and build them into good, solid, healthy American citizens.

In 1917, Father Flanagan borrowed $90 from a friend and rented a house in Omaha. To this home — the first Father Flanagan's boys' home — he took his first five charges. Because of the war, many cases were called to his attention and soon the quarters were overcrowded. Then he purchased the Overlook Farm, a 160-acre tract, 10 miles west of Omaha.

Rebuilding the flimsy shelters and paying on the mortgages as he could, the home has grown into a legally incorporated city as it is today — fireproof buildings, workshops in which boys may learn trades, gymnasium, an accredited grade and high school, its own postoffice, farm, dairy, barn, and herd.

The city now has its own mayor and municipal government, elected by the boys themselves. Trades taught include printing, office and clerical work, farming, dairy-farming, shoe repair, drycleaning and laundry work, carpentry and woodwork, cooking and landscape gardening. It has its own athletic director, complete dental facilities, physician, and a fully equipped modern infirmary. No boy leaves Boys Town until he is assured of social security and an opportunity to make good. Each boy is allowed to follow the spiritual guidance and teachings of his own faith.

Father Flanagan was born in Ireland in 1886, and has received many honorary degrees from universities. Recently Metro-Goldwyn-Mayer completed a motion picture depicting his work and starred Spencer Tracy and Mickey Rooney, stressing Father Flanagan's belief that there is no such thing as a bad boy.

■ ■

Cities Service Gas Co. Completes 61-Mile Line

The Cities Service Gas Co., Bartlesville, Okla., recently completed its 61-mile, 12-in. line from Kingman and Pratt Counties to Wichita, Kan., and gas was turned through the line Oct. 4.

The line was not constructed to serve any new towns or markets and, at this time, no branch lines are being constructed, according to an announcement from G. C. Roth, assistant secretary of the company.

The pipe line will be used to deliver gas from the Cunningham field into the company's general pipe line system near Wichita. *(GAS*, July, 1940, p. 62.)

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Oklahoma School for Deaf Heated With Gas

The Oklahoma School for the Deaf is now being heated with gas instead of coal following the recent construction of a new gas main to the school by the Community Natural Gas Co., Dallas, Texas, according to Charles Barndt, district superintendent.

Convention Notes

By ELLIOTT TAYLOR

CALL it Defense or call it War, the major preoccupation of the General Sessions of the American Gas Association's annual convention in Atlantic City, October 7-10, inevitably revolved about the subject of the relation of the industry and of the nation it serves to the critical and climaxing decisions that now confront the United States.

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Demonstrating and announcing their readiness to meet any demands that may be made on them, the 2960 delegates indicated too that they are alive to the political temper of the times; and many of the speakers examined with devastating realism the basic flaw in a national leadership that would convert the nation into a totalitarian state as the only defense against totalitarianism.

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The Natural Gas Section, traditional early bird of the A. G. A., took over on Monday, the opening day, when delegates' ears were sharp and eyes were brightest. High spot of the Natural Gas meetings was the paper by Dr. R. W. Miller, research director of the Peoples Natural Gas Co., and Hope Natural Gas Co., Pittsburgh, and John A. Clark, assistant general superintendent and chief engineer of Hope Natural Gas Co., Clarksburg, W. Va. "Liquefication, Storage and Regasification of Natural Gas for Peak Loads" was their subject. The new system, under which 600 cu. ft. of gas can be stored as 1 cu. ft. of liquid, fascinated the audience, as indicated by the flood of questions answered by Mr. Clark upon the conclusion of his reading of the paper.

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Monday was also annual meeting day for the Association of Gas Appliance and Equipment Manufacturers, at which they elected to their presidency, W. E. Derwent, vice president of the George D. Roper Corp., Rockford, Ill.

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CP Range promotion was everywhere; in store windows, in the air, underfoot and at shoe level, eye level and sky level. A. G. A. E. M. promotion for 1941 will feature strongly the continuation of the CP campaign.

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Good news in the report of A. G. A. Treasurer Ernest R. Acker was that the association had gained 553 net in membership during the fiscal year, and had operated within its budget.

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Political, social and economic changes now under way are destined to profoundly affect the future of the country as well as the gas industry, in the studied opinion of Retiring President Walter C. Beckjord, whose address, "The Gas Business in the Modern World," keynoted the entire convention. Urging that more funds be allocated to market surveys, promotion and fundamental research, he pointed out that at present less than 1% of the industry's gross revenue goes into advertising.

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The impact of defense expenditures on our national economy, and a consideration of the reconstruction problems that will have to be met in post war years, were both analyzed in an objective manner by Dr. Harold G. Moulton, president of the Brookings Institution under his topic "Industry in a Changing World." Neither defense preparations nor conditions in Europe will necessitate any great disruption in either our productive system or our price structure, in Dr. Moulton's opinion, and unit costs should tend to decrease as existing plant capacity is used, providing labor costs do not rise.

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"The principal policies on which a united front is needed, and a better understanding and cooperation will be most effective are those relating to quality of equipment, price and sales promotional activities." In these words, Frank H. Adams, retiring president of the A.G.A.E.M., introduced his theme of "A United Front" and its implica-

NEW AMERICAN GAS ASSOCIATION LEADERS (1940-1941)

Administrative Officers

President: T. J. Strickler, vice president and general manager, Kansas City Gas Co., Kansas City, Mo.

First Vice President: George F. Mitchell, president, The Peoples Gas Light & Coke Co., Chicago, Ill.

Second Vice President: George S. Hawley, president, the Bridgeport Gas Light Co., Bridgeport, Conn.

Treasurer: Ernest R. Acker, president, Central Hudson Gas & Electric Corp., Poughkeepsie, N. Y.

Directors — Two Year Terms

John W. Batten, vice president, Michigan Consolidated Gas Co., Detroit, Mich.

A. F. Bridge, vice president and general manager, Southern Counties Gas Co., Los Angeles, Calif.

James A. Brown, engineer in charge of gas operations, Commonwealth & Southern Corp., New York, N. Y.

D. W. Harris, vice president and general manager, Arkansas Natural Gas Corp., Shreveport, La.

Conrad N. Lauer, president, the Philadelphia Gas Works Co., Philadelphia, Pa.

H. N. Mallon, president, Dresser Manufacturing Co., Bradford, Pa.

F. H. Payne, president, American Meter Co., Erie, Pa.

Herman Russell, president, Rochester Gas & Electric Corp., Rochester, N. Y.

N. T. Sellman, assistant vice president, Consolidated Edison Co. of New York, Inc., New York, N. Y.

Marcy L. Sperry, president, Washington Gas Light Co., Washington, D. C.

P. S. Young, chairman of the Executive Committee, Public Service Electric & Gas Co., Newark, N. J.

Section Chairmen

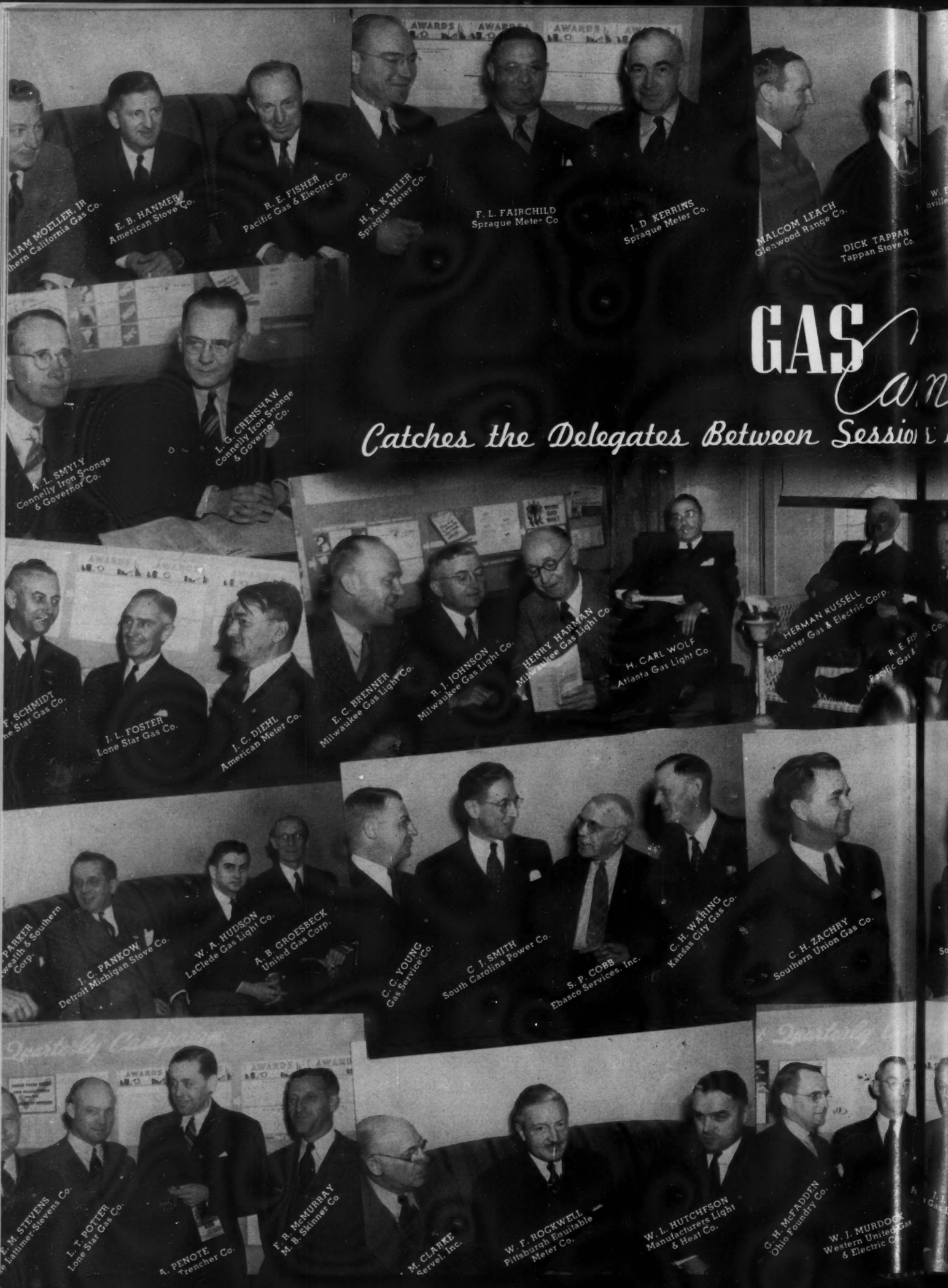
Accounting Section: Chairman, E. N. Keller, Philadelphia Electric Co., Philadelphia, Pa.; vice chairman, Lyman L. Dyer, Lone Star Gas Co., Dallas, Texas.

Commercial Section: Chairman, R. J. Rutherford, Worcester Gas Light Co., of Worcester, Mass.; vice chairman, E. J. Boyer, Minneapolis Gas Light Co., Minneapolis, Minn.

Industrial Gas Section: Chairman, H. Carl Wolf, Atlanta Gas Light Co., Atlanta, Ga.; vice chairman, George F. B. Owens, the Brooklyn Union Gas Co., Brooklyn, N. Y.

Manufacturers' Section: Chairman, Watson E. Derwent, Geo. D. Roper Corp., Rockford, Ill.

Natural Gas Section: Chairman, Harry D. Hancock, Gas Advisers, Inc., New York, N. Y.; vice chairman, J. French Robinson, the Peoples Natural Gas Co., Pittsburgh, Pa.

Technical Section: Chairman, D. P. Hartson, Equitable Gas Co., Pittsburgh, Pa.; vice chairman, Harold L. Gaidry, New Orleans Public Service, Inc., New Orleans, La.

WILLIAM MOELLER, JR.
Southern California Gas Co.
E. B. HANMER
American Stove Co.
R. E. FISHER
Pacific Gas & Electric Co.
H. A. KAHLER
Sprague Meter Co.
F. L. FAIRCHILD
Sprague Meter Co.
J. D. KERRINS
Sprague Meter Co.
MALCOM LEACH
Glenwood Range Co.
DICK TAPPAN
Tappan Stove Co.
GAS Ca
Catches the Delegates Between Sessio
L. G. CRENSHAW
Connelly Iron Sponge & Governor Co.
A. L. SMYLY
Connelly Iron Sponge & Governor Co.
E. C. BRENNER
Milwaukee Gas Light Co.
R. J. JOHNSON
Milwaukee Gas Light Co.
HENRY HARMAN
Milwaukee Gas Light Co.
H. CARL WOLF
Atlanta Gas Light Co.
HERMAN RUSSELL
Rochester Gas & Electric Corp.
J. L. FOSTER
Lone Star Gas Co.
J. C. DIEHL
American Meter Co.
J. C. PANKOW
Detroit Michigan Stove Co.
W. A. HUDSON
LaClede Gas Light Co.
A. B. GROESBECK
United Gas Corp.
C. C. YOUNG
Gas Service Co.
C. J. SMITH
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Ebasco Services, Inc.
C. H. WARING
Kansas City Gas Co.
C. H. ZACHRY
Southern Union Gas Co.
E. M. STEVENS
Lattimer-Stevens Co.
L. T. POTTER
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A. PENOTE
Trencher Co.
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G. H. McFADDEN
Ohio Foundry Co.
W. I. MURDOCK
Western United Gas & Electric Co.

Camera

sion at A. G. A.'s Annual Convention

tions to both utilities and manufacturers, in the Wednesday morning General Session.

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F. C. Smith, president of Houston Natural Gas Co., and an outspoken exponent of "Organization for Fundamental Research," presented in his report specific recommendations which, if followed through, will result in the establishing of an Institute of Gas Technology. (See page 23.)

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Conflicting economies are striving for ascendency in the world today, said Dr. Harvey N. Davis, president of Stevens Institute of Technology. One is the Power Economy, as exemplified by the dictator states, and the other is the Welfare Economy of the democratic nations. Although we may have to adjust ourselves to the power economy pressure, we need not lose sight of the value of our own democratic ideal of the greatest good for the greatest number.

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Enthusiasm and accord greeted the announcement that Herman Russell, president of the Rochester Gas and Electric Corp., Rochester, N. Y., had been selected by the awards committee to receive the Charles A. Munrow Award, which was presented by Mr. Munroe in person.

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The Beal Medal Award for outstanding technical contributions went to Raymond F. Hadley of Susquehanna Pipe Line Co., Philadelphia, in recognition of his studies resulting in a paper on "Microbiological Anaerobic Corrosion."

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Gas is a better product than gas men have painted it, if a *Fortune* Survey by Elmo Roper, conducted recently in Brooklyn can be taken as a national criterion. *Fortune's* findings convinced its researcher that consumers do not associate gas with progress, a condition that can best be corrected by increased advertising and promotional activities.

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Time and Place of the next A.G.A. Convention have been left in abeyance for further consideration by the committee.

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Bingo — in a big way, with $2000 worth of prizes donated by the manufacturers of appliances and equipment, gladdened the hearts of winners of the valuable merchandise distributed at the party Tuesday night.

• • •

Delegates with sufficient reserve energy to carry them through a day of post-convention entertainment were royally rewarded for their attendance at Gas Industry Day at the New York World's Fair on Friday, soon to pass into the realm of history. New York metropolitan gas companies and the A. G. A. E. M. played host.

• • •

The exclusive, esoteric and ultra-inner circle organization of peddlers known as the Gild of Ancient Supplers of Gas Appliances, Skills, Gins, Accessories and Substances dined under the admiring eyes of each other and Senior Warden William S. Guitteau on Monday night, and listened noisily to an address by Arthur Dunn on the place of salesmen in the machine age. The place of the salesmen in the machine age is, as far as one G. of A. S. of G. A. S. G. A. and S. member could recall, is in the machine age.

Reginald H. Field, of Shreveport, La., senior engineer of the United Gas Pipe Line Co., won the $50 annual award established by the Personnel Practices Committee of the American Gas Association for the outstanding student in the Natural Gas Extension Course at the University of Kansas. The announcement was made by Dr. C. M. Young, head of the Department of Mining Engineering at the University, who had charge of the course.

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Modest lapel buttons about the size of a dinner plate, hung on delegates by Bob Agee of A. G. A. E. M., pushed the new slogan of CP promotion, "For everyone in Forty-one it's CP."

• • •

Three luncheon meetings were devoted to subjects related to personnel, practices, accounting and industrial gas, respectively. The home service interest was treated at a well-attended breakfast meeting on Wednesday.

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Those who slipped away early from the Wednesday afternoon meeting of the Commercial Section missed a high spot in the showing of the new color film, sponsored by the Pacific Coast Gas Association, "Fun in the Kitchen."

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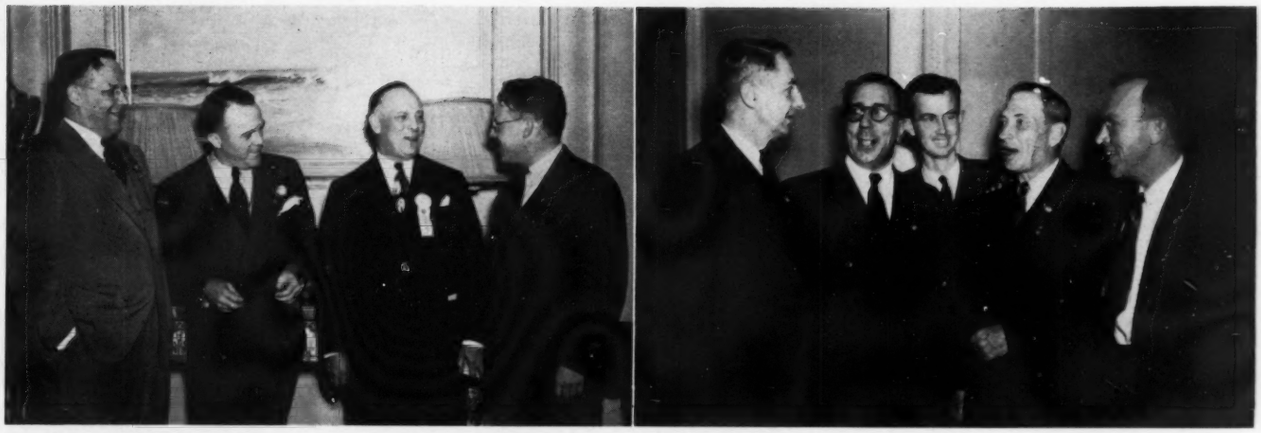
No enthusiasm for meetings could excel that of the Industrial Section, which held one more session on Thursday afternoon, when all others had fled. Skillfully directing the panel discussion, H. Carl Wolf asked leading questions and elicited executive opinions from Herman Russell, R. E. Fisher, C. E. Bennett and Norman McKee, on the methods and procedure followed in securing and servicing the industrial load in various sections of the country.

ALONG the Atlantic City Boardwalk: LEFT: Mrs. A. Ritchie, Hong Kong, China; Mrs. R. S. Agee, New York; Mrs. Jay Jenkins, Los Angeles; Mrs. Stanley Jenks, Philadelphia. CENTER: E. D. Milener, American Gas Association; Allen Pope, First Boston Corp.; Mrs. F. T. Rainey; F. T. Rainey, Ohio Fuel Gas Co. RIGHT: Morse Dell Plain, American Street Illuminating Co.; R. H. Knowlton, The Connecticut Light & Power Co.; N. B. Bertolette, Hartford Gas. Co.



The photographer caught these groups between sessions at the annual meeting of the Association of Gas Appliance and Equipment Manufacturers in Atlantic City, N. J., Oct. 7. AT LEFT (left to right): Frank H. Adams, retiring president of the Association; George S. Jones, Jr., vice president and general sales manager, Servel, Inc.; W. E. Derwent, vice president, George D. Roper Corp. and the newly elected president of the Association, and H. N. Ramsey, president, Welsbach Co. AT RIGHT: Far from home are these West Coast men who attended the meeting (left to right): Clifford Johnstone, managing director, Pacific Coast Gas Association; W. R. Smith, Continental Water Heater Co., Los Angeles; W. J. Bailey, Jr., Day and Night Manufacturing Co., Monrovia, Calif.; R. G. Logue, Ward Heater Co., Los Angeles, and W. G. Cartter, Day and Night Manufacturing Co.

At A.G.A.E.M.'s Annual Meeting

THE Association of Gas Appliance and Equipment Manufacturers held its annual meeting at the Hotel Claridge in Atlantic City, N. J., October 7. W. E. Derwent, vice president, George D. Roper Corp., Rockford, Ill., was elected president succeeding Frank H. Adams, vice president of the Surface Combustion Corp., Toledo, Ohio.

W. F. Rockwell, president of the Pittsburgh Equitable Meter Co., Pittsburgh, Pa., was elected vice president.

It was decided that the 1941 annual meeting of the association would be held on the Pacific Coast. W. R. Smith, vice president of the Continental Water Heater Co., Los Angeles, is chairman of the Time and Place Committee. Tentative plans subject to the committee's approval call for a meeting in June, probably in Los Angeles.

Other activities of the meeting was the election of the board of directors for 1941 and the formulation of the national sales promotion program for the coming year.

Mr. Derwent is also a director of the American Gas Association and a past president of the Mid-West Gas Association and, up until his election as president, was chairman of the A.G.A.E.M.'s Domestic Gas Range Division.

Those elected to serve on the Association's board of directors for 1941 are: E. C. Adams, president, Adams Bros. Mfg. Co., Pittsburgh, Pa.; Frank H. Adams, vice president, Surface Combustion Corp., Toledo, Ohio; A. P. Brill, president, Ruud Mfg. Co., Pittsburgh, Pa.; Merrill N. Davis, vice president, Dresser Mfg. Co., Bradford, Pa.; F. L. Fairchild, vice president, The Sprague Meter Co., Bridgeport, Conn.; N. R. Feltes, vice president, Bastian Morley Co., LaPorte, Ind., F. J. Fieser, American Radiator & Standard Sanitary Corp., New York; W. A. Lean, general sales manager, The Wilcolator Co., Newark, N. J.; S. E. Little, vice president, American Stove Co., Cleveland, Ohio; R. S. Lynch, manager, water heater sales, Whitehead Metal Products Co, New York; C. O. Menig, secretary, Pacific Gas Radiator Co., Huntington Park, Calif.; R. L. L'Brien, secretary, Detroit Brass & Malleable Works, Detroit, Mich.; Louis Ruthenberg, president, Servel, Inc., Evansville, Ind.; W. L. Seelbach, secretary and treasurer, The Forest City Foundries Co., Cleveland, Ohio; W. R. Smith, vice president, Continental Water Heater Co., Ltd., Los Angeles, Calif., and A. P. Tappan, vice president, The Tappan Stove Co., Mansfield, Ohio.

Serving on the advisory council, of which Mr. Brill is chairman, are: John C. Diehl, chief engineer, American Meter Co., Erie, Pa.; R. G. Logue, vice president, Ward Heater Co., Ltd., Los Angeles, Calif.; L. R. Mendelson, president, Hotstream Heater Co., Cleveland, Ohio; H. N. Ramsey, president, Welsbach Co., Gloucester City, N. J.; and W. T. Rasch, gas products department, American Radiator & Standard Sanitary Corp., New York.

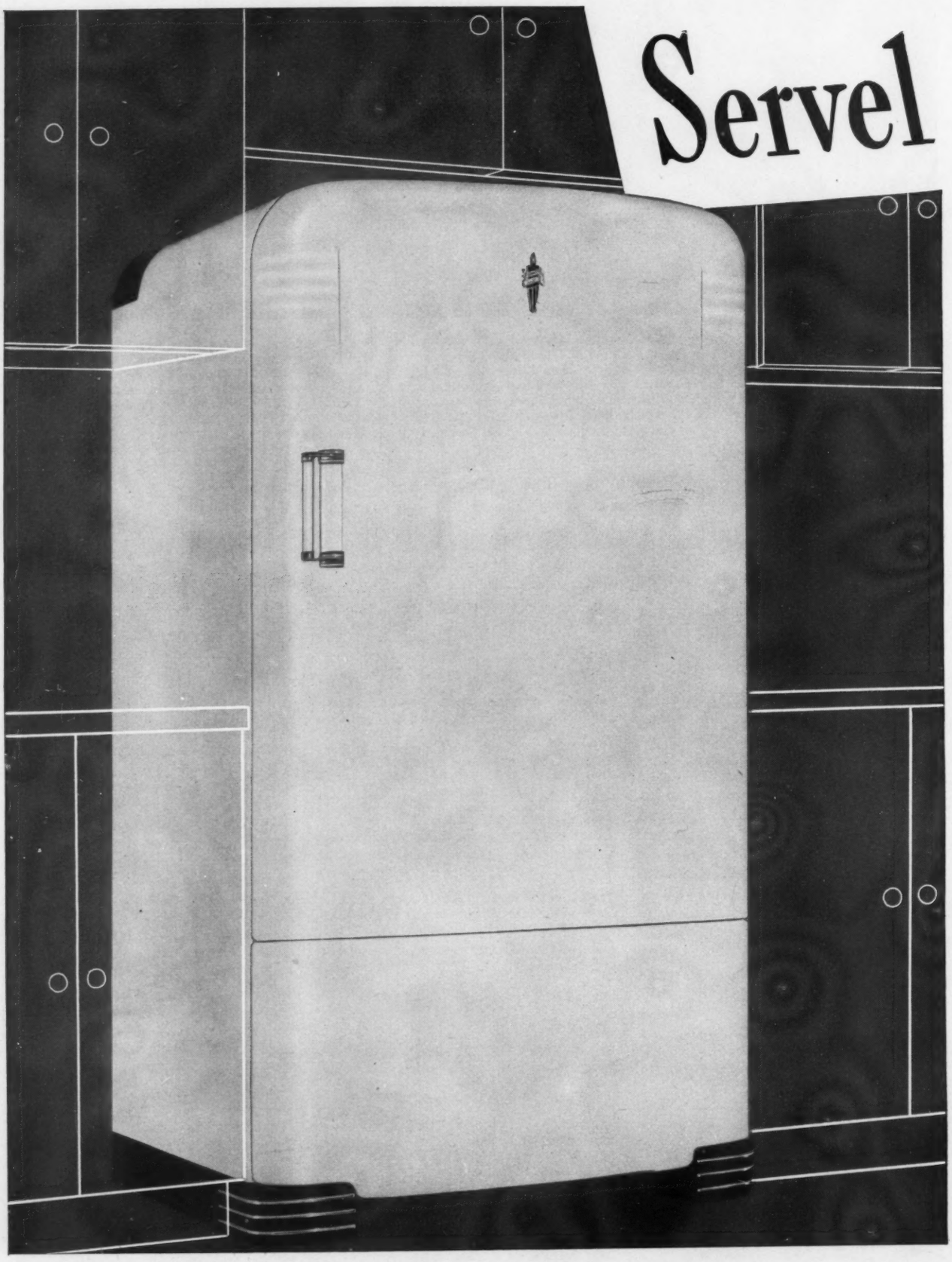
The guest speaker at the main general session was Arthur Hirose, research director of the McCall Corp. of New York. He brought out the fact that the gas appliance industry has demonstrated a lively vitality during the past four years as a result of which it is today a leader among the more "advertising and sales promotion-minded" industries. His remarks were based on a nation-wide survey of the household gas appliance business. He also stated that the survey indicated that sales of gas refrigerators and gas water heaters would this year probably exceed sales figures of any of the past 10 years.

It was reported at the convention that gas appliance sales throughout the country increased during the first eight months of this year as compared to sales figures for the same months in 1939. Sales of gas-fired furnaces rose 47.6% during the period while domestic gas range sales were up 17% and automatic gas water heaters registered an increase of 13.4%.

Following a meeting of the Association's Gas House Heating and Air Conditioning Equipment Division, it was announced that 11 manufacturers had agreed to finance the national sales promotion program in 1941 for gas-fired furnaces somewhat similar in scope to the current CP gas range campaign.

The cooperative budget allowed for the drive is $115,000, which exceeds that of 1940. These funds are in addition to expenditures by the 26 gas range companies producing CP ranges and the American Gas Association's half-million-dollar appropriation for 1941 gas cookery and CP range promotion.

The program includes eight separate items: Gas industry campaigns; dealer promotions; publication of range merchandising handbook; consumer and sales training aids; a field planning service; a CP audio-training service;



★ ITS BEAUTY IS ONLY THE BEGINNING . . .

for 1941 presents...

★ New beauty
★ New efficiency
★ New economy
★ New convenience

THIS beautiful new Gas Refrigerator has *everything* American families want! Every feature, every improvement of the 1941 Servel Electrolux will invite more sales during the coming year.

For every one was determined after extensive research among American families!

Housewives declared they wanted 5 fundamentals in their next refrigerators: permanent silence, long life, constant temperature, low operating cost, freedom from costly repairs.

In addition, it was found they wanted greater storage space, streamlined beauty, faster freezing, ice cubes and grids that are easy to remove, and many other conveniences. So—Servel gave them what they wanted!

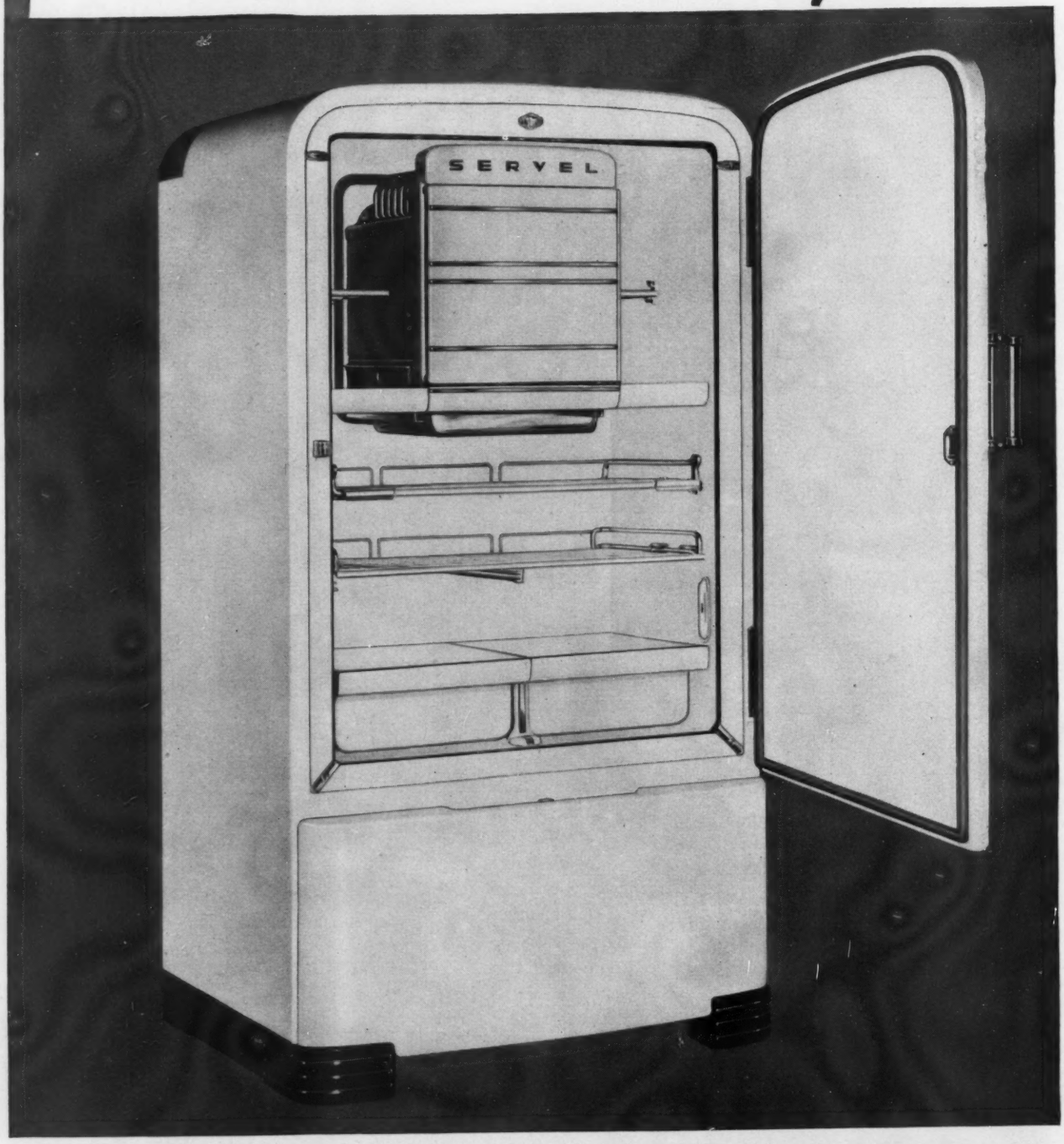
New quality . . . new values . . . new beauty in the NEW 1941 Servel Electrolux! It's the most beautiful refrigerator ever designed . . . streamlined to fit the times with new features that further improve the only automatic refrigerator that freezes with no moving parts . . . *stays silent—lasts longer.*

The cabinet has been reduced in depth to fit more advantageously into the modern kitchen . . . the stainless steel trim on the base adds to the beauty . . . the door is full width . . . the door latch has been redesigned but retains popular push and pull features . . . the handle is of transparent plastic, will not fingerprint or mark.

But that's only the outside . . .

WAIT TILL YOU SEE THE INSIDE STORY ➡

Watch their eyes...



WIN GOOD WILL FOR GAS AND

WHEN THEY SEE SERVEL FOR '41

More Ice Cubes, Easier to Remove . . . Sliding Shelves . . . Redesigned Interior . . . Other Exciting Features . . . All Will Help to Boost Gas Refrigeration Among Your Customers

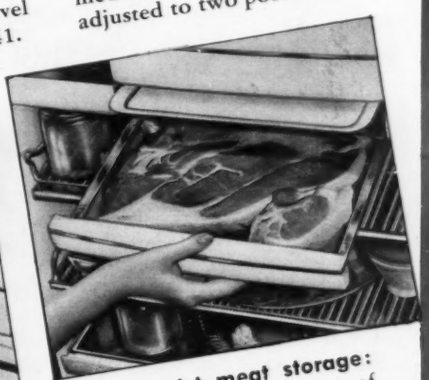
39% more ice . . . faster freezing with this new, de luxe improved Servel Electrolux freezing unit. Note the new and improved trigger release design, the handy extra space for storing frozen foods.

New grid and cube release of improved design operates in a single easy motion, freeing both grid and ice cubes at the same time. This is another exclusive Servel Electrolux sales feature for 1941.

3-position sliding shelf can be raised or lowered without removing the food. For still greater flexibility, the shelf immediately below may be quickly adjusted to two positions.

MOIST COLD... DRY COLD... Servel Electrolux gives both!

Dew-action vegetable freshener: moisture collects and falls like morning dew from the under side of the transparent glass cover.



Dry or moist meat storage: simply change the position of the porcelain cover to allow more or less air to circulate.

PLUS MANY OTHERS . . . EACH AN ADDED SALES POINT!

Stays silent...lasts longer

SERVEL
ELECTROLUX
Gas
REFRIGERATOR

GAS SERVICE WITH

CP Range Club activities; and home service contests.

Two major campaigns will be staged during the year. A spring drive (March, April, May, and June) and a fall campaign (September, October, November, and December). Spring mailing pieces of promotional material will begin in January and 15,000 key gas range dealers throughout the United States and Canada will receive the literature. This promotional material will stress the fact that ranges bearing the CP stamp offer the greatest merchandising opportunity in the gas appliance field.

A gas range merchandising handbook titled "Consumer Education and Sales Training Aids" will contain sales, demonstration and display ideas and suggestions to be distributed to the dealers. Health and food charts, 43 in number, form the nucleus for a gas cookery story from the health and food savings standpoint.

The new CP Audio-Training Service will be conducted on an even larger scale in 1941 than it was last year.

A sound film entitled "The Parade to Profits" is designed exclusively for dealer and gas company showings. Another sound film, "Straight to Your Heart," is to be shown to either consumer, gas company, or dealer employes. It tells a complete story of the CP range.

The manufacturers have also appropriated funds for a $1500 prize contest which will be open to the home service representatives of utility companies who make the best streamlined demonstrations for 1941.

More than 10,000 gas company and range dealer salesmen have already been registered for participation in the CP Range Club and the program for this sales club includes the offer of all-expense trips, cash prizes, national and regional awards, and trophies to sales winners.

The field planning will be conducted through the A. G. A.'s regional managers, the chairman of the domestic gas range committee and 48 state managers who will assist in setting up local CP range promotional activities.

The manufacturers have made available the services of a field staff to offer assistance in gas company and dealer sales training meetings and help in setting up campaign plans. In addition a Campaign Planning Bureau is offered at the association's headquarters where ideas for newspaper ads, sales contests, and other miscellaneous suggestions may be obtained.

Gas Company Winners Announced In National Safety Council Contest

THE National Safety Council, Chicago, Ill., presented trophies to winners of the Public Utilities Section Safety Contest at the National Safety Congress held in Chicago, October 7-11. Two hundred and thirty-four awards for outstanding accident prevention records in the Industrial Safety Contest sponsored by the Council were given out.

Trophy winners in the gas division were:

Group A—Columbia Gas and Electric Corp., Wilmington, Del., Columbus group, 6,256,760 hours, 11 injuries.

Group B—The Dallas Gas Co., Dallas, Texas, 1,180,432 hours, 3 injuries.

Group C—Fall River Gas Works Co., Fall River, Mass., 501,930 hours, 3 injuries.

Winners for the combination gas and electric division are:

Group A—Virginia Electric and Power Co., Richmond, Va., 3,945,582 hours, 6 injuries.

Group B—Pennsylvania Edison Co., Altoona, Pa., 1,586,916 hours, 2 injuries.

Group C—Fitchburg Gas & Electric Light Co., Fitchburg, Mass., 358,454 hours, no injuries; Leominster Electric Light & Power Co., Leominster, Mass., 153,328 hours, no injuries; Moncton Electricity & Gas Co., Ltd., Moncton, N. B., Canada, 116,312 hours, no injuries; Athol Gas & Electric Co., Athol, Mass., 95,891 hours, no injuries; Wachusett Electric Co., Clinton, Mass., 91,150 hours, no injuries.

Those receiving certificates of merit in the gas division were announced as follows:

Group A—Hope Natural Gas Co., Pittsburgh, Pa., 4,277,586 hours, 15 injuries; the Peoples Natural Gas Co., Pittsburgh, Pa., 3,357,291 hours, 15 injuries.

Group B—Manila Gas Corp., Manila, P. I., 1,564,722 hours, 4 injuries; the St. Louis County Gas Co., St. Louis, Mo., 878,489 hours, 4 injuries.

Group C—Lynchburg Gas Co., Lynchburg, Va., 148,528 hours, 1 injury; Columbia Gas & Electric Corp., Binghamton group, 586,053 hours, 4 injuries.

Listed in the combination gas and electric division as winners of merit certificates are:

Group A—Wisconsin Public Service Corp., Milwaukee, Wis., 3,050,206 hours, 8 injuries; Wisconsin Power & Light Co., Madison, Wis., 3,364,725 hours, 10 injuries.

Group B—Southwestern Gas & Electric Co., Texarkana, Ark-Tex., 1,286,952 hours, 3 injuries; Central Illinois Light Co., Peoria, Ill., 2,288,190 hours, 7 injuries.

Enrollment in the contests broke all previous records with a total of 1202 organizations in the 1939-40 competition. This was a 12% increase over the previous year. Employes of all participants worked a total of 2,313,301,469 man-hours during the year with an average of only 9.51 injuries per million man-hours.

The competition was divided into seven sectional contests based on type of industry — chemical, metals, rubber, public utilities, marine, and paper and pulp.

■ ■

Mid-West Gas Association Conducts School at Ames

Four sectional meetings, Meter, Distribution, Utilization and Production, will highlight the Twentieth Annual Gas School and Conference at the Iowa State College, Ames, Iowa, Nov. 11-13.

Problems in connection with these topics will be discussed by experienced and capable men from the gas industry, supplemented by discussions conducted by faculty members of the Engineering Extension Service of the college.

H. E. Peckham, Northern States Power Co., is general chairman of the meeting; H. K. Wrench, Minneapolis Gas Light Co., vice general chairman, and R. B. Searing, Sioux City, Iowa, secretary-treasurer.

Committee chairmen are: Eugene O. Olson, arrangements; C. B. Holman, meter section; E. P. Hennek, distribution section; E. A. Brown, utilization section, and C. A. Bland, production section.

■ ■

Jones City, Okla. Votes Funds For Natural Gas System

Jones City, Okla., recently voted to establish a municipal natural gas system in the town.

The town voted $15,000 in bonds, which supplemented by a WPA grant of $25,000, will enable the citizens to install the service. The municipality is considering the alternative of securing a natural gas supply from local wells, and if this cannot be accomplished, of constructing 26,000 ft. of line to a connection with a transmission line of the Oklahoma Natural Gas Co., Tulsa, Okla., on East 23rd Street, Oklahoma City.

■ ■

Kentucky Public Service Co. Gets New Supply of Gas

The Kentucky Public Service Co., Inc., Glasgow, Ky., recently started serving Litchfield, Ky., with gas from the Seaton well, according to W. F. Stevens, president. The company has owned the well for eight years but only recently constructed 12 miles of line to bring gas to the city. A number of customers, including industrials, will also be served along the line which consists of two miles of 6-in., three miles of 4-in., and the balance 3-in. diameter pipe.

■ ■

Gas in Vermilion, Canada

Vermilion, Alberta, expects to have natural gas from the adjacent Vermilion field as soon as construction of the line is completed. The Franco Public Services, Ltd., has the franchise.

Give the People what They want!

Now we can turn from the heated promises that flow out of politicians back to the heating performance that flows out of gas pipes. In either case, it's a matter of striving to give the people what they want.

In the gas business, serving the people well depends not only on the quality of your gas but also on the merit of the appliance that burns it. *Your load is as good as the appliance you sell.*

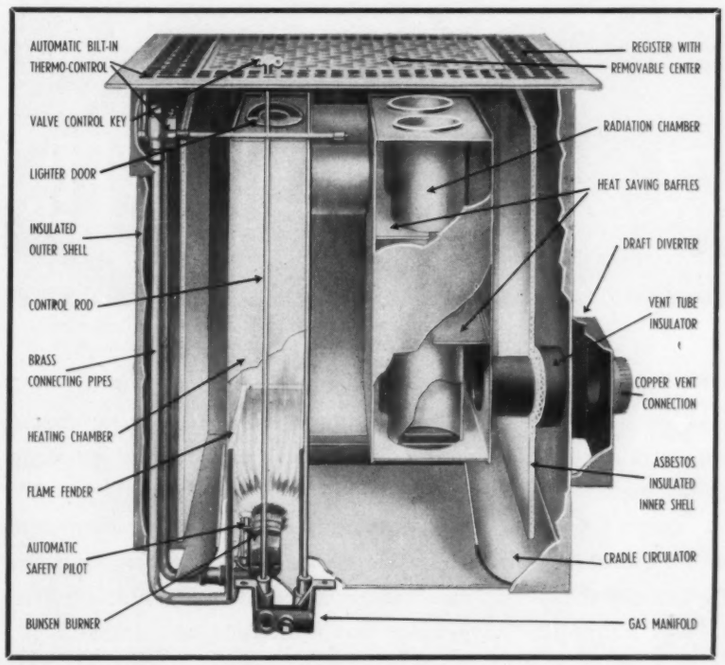
Today's space heating installations show that more and more people want *floor furnaces.* The recent A.G.A. convention reported *more than a hundred different approved brands of floor furnaces* on the market now. Ten years ago there were *only four!*

WARD pioneered the floor furnace idea thirty years ago. WARD led the field when there were three competitors . . . leads it today when there are *more than one hundred.* To give the people what they want we have been forced to stop making other types of heating equipment and devote our entire, increased plant capacity to building floor furnaces *exclusively.*

Don't these facts suggest that if you are not giving floor furnaces a major place in your space heating program . . . you are missing something?

Between now and Groundhog Day, you can *get in on the ground floor* of a lot of homes with WARD Floor Furnaces. After the first of the year the boom in small home construction will gather momentum. In homes of this type . . . without basements . . . too small for unit heat . . . where first cost is important . . . a WARD Floor Furnace is the ideal appliance.

Drop us a line and we'll be glad to "tell all."



FACTORY REPRESENTATIVES

A. S. KINCAID, *Southern Manager,* P.O. Box 5, Dallas, Texas... J. H. STUBBINS, 300 East 68th Terrace, Kansas City, Missouri... H. C. SANDERSON, 207 Fulton Building, Pittsburgh, Pennsylvania... L. E. KIRKPATRICK, 1700 15th Street, Denver, Colorado... LEON M. TAYLOR, 3200 Main Street, Dallas, Texas

ASK FOR OUR LATEST CATALOG

WARD HEATER COMPANY

LOS ANGELES

You need WARDS . . . whether you feature them exclusively or already carry some other line. There's a big demand for a floor furnace with *completely built-in automatic features* . . . like our *Cradle Circulator, Automatic Pilot* and *Bilt-in Thermo-Control* (a built-in thermostat that really works). The WARD FLOOR FURNACE is a complete package ...all features built in...everything self-contained.

Get in on the Ground Floor with

WARD

Floor Furnaces

YOUR LOAD IS AS GOOD AS THE APPLIANCE YOU SELL

Not Only Advertised BUT RECOGNIZED

AUTOMATIC CONTROLS MH

★ National magazines, such as these and many others, have for years carried the banner of Minneapolis-Honeywell and Automatic Heating . . . telling the story of amazing developments, of constantly increasing comfort and economy. . . . The background for this advertising has been the sincere conviction that the Automatic Heating Industry and Minneapolis-Honeywell are partners . . . that the great industry of automatic heating and the finest controls money can buy are inseparable. For more than half a century Minneapolis-Honeywell Controls have not only been nationally advertised. but nationally recognized. . . .

MINNEAPOLIS-HONEYWELL

Minneapolis-Honeywell Regulator Company, 2946 Fourth Ave. S., Minneapolis, Minn. Canadian Plant: Toronto, Ontario. European Plant: London, England. Company owned branches in 49 other cities.

Control Systems

Natural Gas Pipe Line Co.'s Wisconsin Line Under Way

THE Natural Gas Pipe Line Co. of America has completed 36 miles of construction and two multiple river crossings of the 12 called for in the contract in its construction of a 165-mile, 20-in. O.D. welded line from the Geneseo, Ill., compressor station on the company's main line extending from Texas to Chicago to the Milwaukee, Wis., area (*GAS*, Sept., 1940, page 33).

The Dempsey-Wilson Co. of Tulsa, Okla., is the contractor for the first 100 miles of the line and has completed 31 miles of it and the two river crossings since beginning work August 30. I. C. Little of Dallas, Texas, has completed five miles of his contract for the other 65 miles of line since October 19. Both contracts are to be completed by the last of January, 1941.

From the Geneseo station, the line extends in a general northeasterly direction to a point near Genoa City, Wis., then continues to near Union Grove, Wis., and then north to the Milwaukee area.

The line will serve a number of towns along the route and plans have been contemplated for paralleling their present line between Geneseo and the Texas producing fields so that the new area may be adequately provided with gas.

■ ■

Peoples Natural Gas Co. Leases 90-Mile Line

The New York State Natural Gas Corp., Pittsburgh, Pa., an affiliate of the Peoples Natural Gas Co., Pittsburgh, has leased the Peoples Natural Gas Co.'s 90-mile line from the Pew compressing station in Clarion County, Pa., to a point in Potter County, Pa. Approval by the Public Utility Commission has been given.

The gas will be secured from the Hope Natural Gas Co. of West Virginia and that company will be able to furnish 2,037,978,000 cu. ft. of gas yearly to its affiliate. The lease calls for a rental of $120,000 yearly and cost of repairs and maintenance of the line is to be borne by the affiliate. The line was constructed in 1936.

■ ■

Specifications of Values Released For Criticism

The American Gas Association Testing Laboratories recently released to all member gas companies and interested manufacturers their recommended revisions to American standard listing requirements for gas valves Z21.15—1934. The companies are privileged to criticize and make suggestions on the revisions before their final adoption.

Among changes proposed in the specifications are modification in minimum dimensions and tolerances required in the construction of valves and a new strength test regarding rigidity of construction.

■ ■

A. G. A. Testing Laboratories Holds Annual Picnic

Approximately 200 persons attended the thirteenth annual picnic of the American Gas Association Testing Laboratories staff of engineers and office personnel held recently at the Pine Ridge Country Club near Cleveland, Ohio.

R. M. Conner, director of the laboratories, and Eugene Milener, secretary, Industrial Gas Section, gave short talks. It is reported to be the largest social affair ever held by the laboratories staff.

Thirty-Fifth Convention of Empire State Association Attracts 250 Registrants

MORE than 250 executives and department heads of various gas and electric utilities in New York State met on September 26 and 27 at the Westchester Country Club, Rye, N. Y., for the 35th annual convention of the Empire State Gas and Electric Association.

The retiring president, Edward P. Prezzano, presided at the first session. Irving K. Peck, president of the Binghamton Gas Works, who is the new president of the association, presided at the second session.

John L. Haley, president of the Central New York Power Corp., was elected vice president, and Herbert C. Davidson, vice president of the Consolidated Edison Co. of New York, Inc., was elected treasurer.

Mr. Prezzano, in his opening address, declared that both in facilities and trained personnel the industry was ready for defense work and to pledge its efforts "to maintain the American concept of democracy with freedom and opportunity to all."

George S. Hawley, vice president-elect of the American Gas Association and president of the Bridgeport Gas Co., spoke on the problems and future of the gas industry in which he stated that the industry in its century of existence and experience has shown its ability to meet and overcome all obstacles as they were presented and, while greater difficulties now face it, it can and will meet all of them successfully.

H. E. Babcock, chairman of the board of trustees of Cornell University, spoke on rural electrification as the farmer sees it and mentioned the fine job of cooperation in the field going on in the state between farmers, utilities and the college. He injected into the meeting some thought on decentralization and more bargaining power between the utilities and their farm customers.

Dannie Heineman, president of Sofina, a $2,292,000,000 utility holding company, discussed the effect of the war on European utilities and pointed out that the destruction of plants by bombing has been less than might be expected.

Emmett F. Connely, president, Investment Bankers Association of America, spoke on suggested standards for financing and stated that a seller's market now exists and that securities properly conceived would find a ready sale.

I. K. PECK

G. S. HAWLEY

Floyd L. Carlisle, chairman of the board, Consolidated Edison Co. of N. Y., Inc., spoke on the problems ahead and stated that the future was filled with uncertainty, knowing that public demand for service would constantly increase and how these demands are to be met with new government regulations, taxes and restrictions.

Milo R. Maltbie, chairman, Public Service Commission, spoke on regulation and reviewed some of the problems facing utilities and commissions in financing, depreciation and other questions of accounting.

Edward F. Barrett, president, Long Island Lighting Co., was general chairman of the convention, which was one of the most successful in many years, according to reports.

Afternoons were given up to a golf tournament for men, with bridge and motor trips for the ladies. On Thursday evening a reception followed by dinner dancing and entertainment was enjoyed by the entire convention.

■ ■

Tennessee Gas Company Moves Main Office

The Tennessee Gas Co., of Murfreesboro, Tenn., recently moved its state headquarters permanently from Columbia to Murfreesboro. Officers of the company to be stationed there are: C. S. Kressler, vice president and general manager; Hugh R. Ireland, auditor; Roy L. Simpson, general superintendent; and Roy G. Hardison, sales manager.

■ ■

Rates Reduced In Billings

The Billings Gas Co., Medford, Okla., reduced the domestic rates in Billings, Okla., five cents per thousand cu. ft., on Nov. 1.

The rate on the first 1000 cu. ft. was reduced from $1.00 to 95 cents and on all over 1000 cu. ft. from 55 cents per M c.f. to 50 cents. The special school rate at Billings also was reduced 5 cents per M c.f.

"Opportunity Unlimited"

Keynotes A. G. A. Refrigeration Committee's Plans for Another All-Year Sales Campaign

"OPPORTUNITY Unlimited" will be the theme slogan for the ninth consecutive nation-wide gas refrigeration campaign to be conducted by the American Gas Association Refrigeration Committee, according to an announcement by Bernard T. Franck, vice president of the Milwaukee (Wis.) Gas Light Co., who is chairman of the 1941 Refrigeration Committee. The campaign, which opened October 1, 1940, and will run until October 1, 1941, will enlist the aid of the Association of Gas Appliance and Equipment Manufacturers and Servel, Inc.

General set-up of the campaign is like that of the drive just ended which had as its slogan "Life Begins in '40 for Gas Refrigeration." There will be quarterly and monthly campaigns, with special awards to individual winners, and final awards to both company winners and to individual sales employes, who make high records for the year.

The first quarterly drive, October 1 to December 31, 1940, inclusive, has been designated as the "March of Progress" contest. United States Savings Bonds are offered to sales employes who make the highest sales records during the quarterly and monthly campaigns. The bonds are in denominations of $100, $50, and $25. Under the rules of the contest, it is possible for one sales employe to win as many as 16 of these bonds, which means that he or she would have to be the winner in both monthly and quarterly contests.

Another feature of this year's contest is the awarding of an Honor Trip to some point of national interest to the selected representatives of each company winning in its respective classification and to the high salesman in each division in Servel Electrolux sales over the full campaign period.

Company winners will also receive handsome trophies symbolizing the idea of "Best Performance" in gas refrigerator selling.

The first "all-year" refrigerator selling campaign came to a brilliant close at the convention of the American Gas Association in Atlantic City, N. J., on October 8, with the announcement of the winners of the Bermuda flight awards, and the trip by air two days later on a Pan-American clipper ship.

Announcement of the companies and salesmen entitled to the Bermuda flights was made by Bernard T. Franck, chairman of the Refrigeration Committee. Mr. Franck reported that 484 companies, representing 12,189,000 meters, and over 3600 sales employes had competed for awards during the drive.

Under the terms of the 1940 gas refrigeration campaign, trips to Bermuda were offered to 24 companies that led in sales of Servel Electrolux refrigerators during the period of the campaign and to six gas company sales employes with the highest individual sales records. Each winning company chose an official to make the flight on its behalf, making 30 persons entitled to the Bermuda flight. Accompanying the former were eight other gas industry leaders, including officials of Servel, Inc., the A.G.A. and A.G.A.E.M. Those making the Bermuda flight were:

Annual Best Performance Sales Pilots: L. H. Albus, the Gas Service Co., Pittsburg, Kan.; E. V. Bowyer, Roanoke Gas Co., Roanoke, Va.; E. L. Coward, Southwest Natural Gas Co., Lockhart, Texas; Jack W. Fiedler, Atlantic City Gas Co., Atlantic City, N. J.; Walter L. H. Geldert, Jr., Southern Counties Gas Co., Los Angeles, Calif.; Lewis Hamilton, Georgia Public Utilities Co., Augusta, Ga.; Norton J. Holmstrom, Milwaukee Gas Light Co., Milwaukee, Wis.; William A. Hudson, Laclede Gas Light Co., St. Louis, Mo.; R. B. Ingle, Macon Gas Co., Macon, Angeles, Calif.; Raymond G. Rees, Peoples Gas Light & Coke Co., Chicago, Ill.; N. K. Satterfield, Equitable Gas Co., McKeesport, Pa.; Adolph Seerth, Florida Power & Light Co., Miami, Fla.; T. T. Smith, Macon Gas Co., Macon, Ga.; Ralph Steele, Virginia Gas Distribution Corp., of Staunton, Va.; Frank Ga.; J. E. Kern, Southern California Gas Co., Los Angeles, Calif.; Arthur F. R. LeFebvre, Public Service Electric & Gas Co., Trenton, N. J.; J. W. McElderry, Georgia Public Utilities Co., Aiken, S. C.; Clifford E. Paige, Brooklyn Union Gas Co., Brooklyn, N. Y.; Clyde H. Potter, the Southern Counties Gas Co., Los G. Terrill, Atlanta Gas Light Co., Atlanta, Ga.; J. H. Wills, Citizens Gas Fuel Co., Adrian, Mich.; Maurice White, Mobile Gas Service Corp., Mobile, Ala.; J. W. Lee, Atlanta Gas Light Co., Atlanta, Ga.

The Pioneers of Progress Sales Pilots were: Ernest E. Audino, Providence Gas Co., Providence, R. I.; Joseph A. Driscoll, Brooklyn Union Gas Co., Brooklyn, N. Y.; William B. Gilmer, Alabama Gas Co., Montgomery, Ala.; Robert W. Smith, Georgia Public Utilities Co., Griffin, Ga.; Albert Timmer, Jr., Michigan Consolidated Gas Co., Muskegon, Mich.

Flight Guests were: C. W. Berghorn, A. G. A. E. M., New York City; B. O. Brown, Servel, Inc., New York City; R. C. BonSeigneur, Servel, Inc., Evansville, Ind.; R. J. Canniff, Servel, Inc., Evansville, Ind.; W. E. Derwent, A. G. A. E. M., Rockford, Ill.; B. T. Franck, Milwaukee Gas Light Co., Milwaukee, Wis.; Geo. S. Jones, Jr., Servel, Inc., Evansville, Ind.; John W. West, Jr., American Gas Association, New York City; Grant Fink, Servel, Inc., Chicago, Ill., and Louis Ruthenburg, Servel, Inc., Evansville, Ind.

The entrants in these annual gas refrigeration campaigns, both companies and individuals, compete for awards in certain groups or classifications. Groups are classified as follows:

Division 1: Comprising eight large metropolitan companies.

Division 2: Comprising companies having 30,001 or more meters, excluding those in Division 1 (rate *over* 12 cents per therm).

Division 3: Companies having 3,001 to 30,000 meters (rate *over* 12 cents per therm).

Division 4: Companies having 9,001 and up, excluding those in Division 1 (rate *under* 12 cents per therm).

Division 5: Companies having 3,001 to 9,000 meters (rate *under* 12 cents per therm).

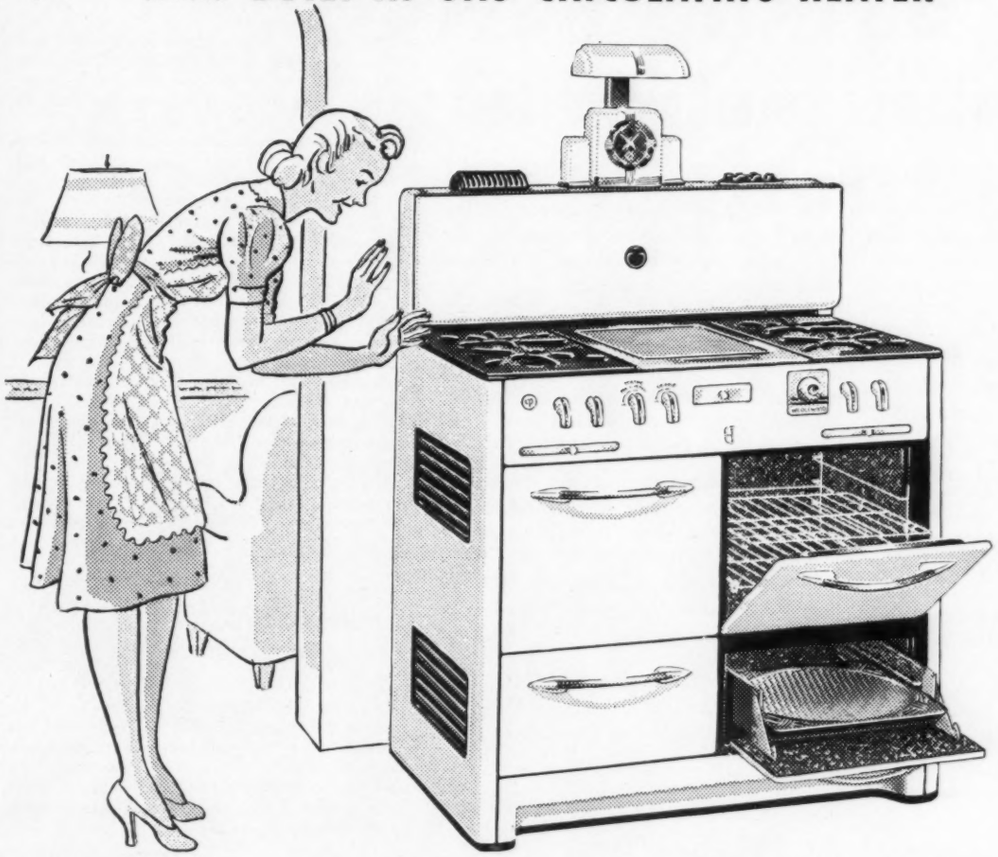
Division 6: Companies having 3,000 meters or less, regardless of rate.

Prominently displayed on on the portfolio cover is the slogan, "Opportunity Unlimited," keynote of 1941's refrigeration sales drive.

The "March of Progress" portfolio carries the ammunition to make the first quarterly section of the all-year campaign a success.

WEDGEWOOD *Ranges*

with **BUILT-IN GAS CIRCULATING HEATER**



KEEP KITCHENS IN THE 70° COMFORT ZONE

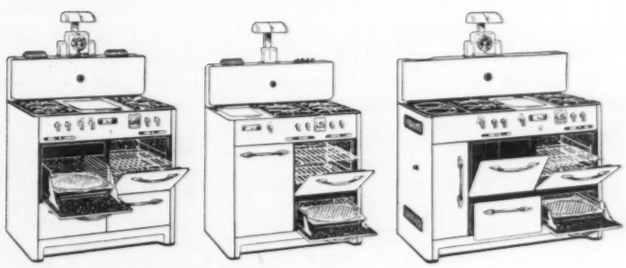
Gas
THE MODERN FUEL

COOKS YOUR FOOD

•

HEATS YOUR ROOMS

From a wide selection of quality ranges –including Trash Burner Models • Gas Heater Models • Compact and De Luxe Gas Ranges—there's a Wedgewood type and size to fit every need and purse.



WEDGEWOOD
MAKES NEW FRIENDS
FOR GAS

WEDGEWOOD

THE MODERN GAS RANGE

JAMES GRAHAM MANUFACTURING CO. • Los Angeles - San Francisco - Newark, Calif. — Portland, Ore.

SALES Slants

Giving a Customer to a Competitor

ONE of the most famous stories given us by Abraham Lincoln, famed for his anecdotes, concerns the innkeeper so busy renting rooms in the east wing that he did not have time to extinguish a fire consuming the west wing.

This story might well apply to salesmen who forget or overlook the value of customers and spend more than a fair share of their time working the prospect list.

We speak of "customers" as comprising those who have been called upon and *sold* not merely on the product but on the representative and on the company he represents. We speak of the "prospect list" as comprising those who are yet to be sold or more than one or all of these things.

Plainly, an initial sale can and should pave the way for new business at some future time. Or if the customer has new gas appliances throughout, she is valuable for the business she can help you get by speaking favorably for gas appliances.

But if you spend too much time "renting rooms in the east wing," the "west wing is liable to burn down." Holding a customer and cultivating her for future sales is no less important than getting initial sales.

Too many salesmen proceed on the faulty conclusion that once a prospect buys she becomes a customer and will remain a customer without further attention. But this conclusion is seldom verified by customer behavior.

If an appliance has not been adjusted properly or if the customer has not been shown how to operate it for maximum efficiency, these things she will attribute to failure of the appliance. If you do not check back, not only will you lose the chance of future sales, but engender in your own back yard a disgruntled customer. By your shortcomings, you'll help to bring to fruition a customer for your competitor.

Don't pass up your old customers too often. They can give you or help you get plenty of new business.

Who Is Master—You or Price?

HOW do you stand on the matter of price? Is price your master, or are you the master of it?

It stands to reason that a salesman who stammers or approaches the question hesitantly when asked to state the price is not sure of his ground.

Yet why shouldn't he be!

The price of a gas appliance is and should be of secondary importance. Still, more otherwise good salesmen stumble and often flatly fail on the price issue than on any other factor involved in the sales procedure.

A customer who says, "I can't pay it," or "that's too much," or "I can't afford it," is saying rather, "you have not convinced me that the need for this appliance is greater than the need for the money I'll have to pay for it."

In truth, a prospect is asking for more proof, more information. She is not questioning the price; she is questioning her need for what you ask her to buy. And it is proof that she has a right to expect and that you are obligated to give.

Answer her by talking merely of "low cost" and you'll get nowhere; answer her by restating need, emphasizing efficiency and the money to be saved and you'll make a sale.

Here's another point to consider: The prospect who denounces your price may be doing so to scare you off. She has learned that most salesmen cannot overcome the price objection and it proves an easy method to rid herself of salesmen. But they'll not want to be rid of you if they are sold on the advantages of the appliance.

Don't give up without telling a story of quality, need and savings. When convinced of these things, the prospect will usually "come across."

Gas Consumers Jump 425,700 In First Eight Months of 1940

CUSTOMERS served by manufactured and natural gas utilities totalled 17,637,300 on August 31, an increase of 425,700 over the number reported on the same date a year ago, according to the latest figures released by Paul Ryan, chief statistician of the American Gas Association.

Revenues of manufactured and natural gas utilities aggregated $587,796,500 for the first eight months of 1940. This was an increase of 7.3% over the corresponding period of 1939.

Revenues from domestic customers gained 6.8%, while revenues from industrial and commercial uses rose 8.4%.

Manufactured gas industry revenues totalled $254,453,600 for the first eight months, an increase of 4.4% from a year ago. Revenues from commercial sales of manufactured gas gained 4.0%, while industrial revenues were 10.5% more than for the corresponding period of 1939. Revenues from domestic uses such as cooking, water heating, refrigeration, etc., were 1.3% more than for a year ago.

Revenues of the natural gas industry for the first eight months aggregated $333,342,900, a gain of 9.6% from a year ago. Revenues from industrial uses increased 8.4%, while revenues from domestic uses rose 9.9%.

During the eight months ending August 31, some 118,397,900,000 cu. ft. of natural gas were used in generating electric power in public utility steam plants throughout the country.

■ ■

Southern Union Gas Co. Analyzes Sales Record

The Southern Union Gas Co., Dallas, Texas, recently analyzed the records of its sales to determine the different types of fuels that are being replaced by gas-burning appliances throughout the system each year. The table below presents just what types of fuels were replaced by the various gas-burning units sold during 1938-39:

Fuel Replaced	*Gas Appliances Sold 1938-1939*	*Per Cent of Total Units Sold*
Electricity	183	1.9%
Coal	1,292	13.3
Wood	333	3.4
Oil	912	9.4
Other fuels	19	.2
None before	2,748	28.3
Gas	4,213	43.5
TOTAL	9,700	100%

The 43.5% of sales replacing gas equipment are mainly the improvements for modernizing homes. Over half of the appliance sales represent new installations or replace competitive fuels.

The Southern Union Utilities Co. (a Southern Union Gas Co. affiliate) recently installed eight Roper ranges in the Monahans (Texas) High School, where 85 home economics students will learn to cook with gas.

■ ■

Servel Sales Convention Discloses 1941 Sales Plan

THE annual sales convention of Servel, Inc., was held at the Ambassador Hotel, Atlantic City, N. J., Oct. 2-7. The 1941 sales program was disclosed to more than 150 sales representatives of the company in attendance.

Louis Ruthenberg, president, spoke on "Tending to Business and Keeping Their Feet on the Ground, Especially in the Field of Creative Selling," and George S. Jones, Jr., vice president and general sales manager, spoke of the trend toward a demand for larger sized refrigerators.

Magic Chef's

ALL-AMERICAN HOLIDAY CAMPAIGN

RINGS THE BELL!

COPR. 1940 AMERICAN STOVE COMPANY

WE GIVE you the bells, we give you the rope! All you have to do is get on the business end . . . and ring in the holiday season with new profits! Plenty of opportunity to tinkle a merry Christmas tune on your cash register with Magic Chef's new "All-American" gas range . . . and with sales helps from the new holiday campaign portfolio. All these . . . plus special C/P promotion material for a really constructive job of selling more C/P Magic Chef Gas Ranges.

GET THE DETAILS NOW. Campaign material you can use for Thanksgiving, Christmas and right up to New Year's Day.

RANGES THAT SELL . . . the popular new "All-American," and other models for every customer, including a low-price promotional model.

FESTIVE TRIMMINGS . . . two display backgrounds and cards, window streamer and sticker set . . . gift tags, decorative price tags.

ADVERTISING HELPS . . . newspaper mats and radio copy, holiday letterheads, mailing cards, gift certificates.

SELLING AIDS . . . new sales visualizer, Pyrex cups for traffic-builders . . . many Prospect-Finder gifts.

POPULAR NEW "ALL-AMERICAN" MODEL A "NATURAL" FOR HOLIDAY SELLING

Here's a range American women asked for . . . and the sensational response this Fall proves it's a bell-ringer for sales appeal.

Ideal for big family dinners . . . with an oven big enough for a 25-pound turkey . . . for baking pies and Christmas cookies and cakes . . . with an extra-deep Swing-out Broiler big enough to broil chickens or to use as an auxiliary oven for many foods. Plenty of top area for the heavy cooking demands of holiday dinners and parties.

Promote it for pre-holiday selling . . . and for "the gift that's just what mother wants."

Magic Chef

THE "RED WHEEL" GAS RANGE WITH THE LIFETIME BURNER GUARANTEE

AMERICAN STOVE COMPANY

World's Largest Manufacturer of Gas Ranges

BOSTON . . . NEW YORK . . . ATLANTA . . . CLEVELAND
CHICAGO . . . ST. LOUIS . . . SAN FRANCISCO . . . SEATTLE
PHILADELPHIA . . . LOS ANGELES . . . PITTSBURGH
BALTIMORE . . . WASHINGTON

New Home Building H ts 10-Year Peak

NEW home construction in 310 leading American cities in 1939 reached the highest level in value and volume in 10 years, according to the annual national home building survey of Investors Syndicate completed and made public last month.

The cities included in the survey, located in 41 states and the District of Columbia, have a population, according to the 1940 preliminary estimate of the U. S. Bureau of Census, of 49,134,705, or 37.4% of the population of the United States. This group includes the 92 cities with a population of 100,000 or more.

New home building in these 310 American cities in 1939 provided housing for 867,664 people. This was a gain of 202,032 people, or 30.4%, over the 665,632 newly housed in these same cities in 1938.

Value of new homes built in 1939, as a result of the fifth annual successive rise, was valued at $798,563,807. This total was 31.4% greater than the 1938 value of $607,588,915.

A shifting of population to meet the needs of trade and industry, along with decreases in vacancies, increases in marriages, further undoubling of families, relatively high rents in some regions, ease of financing and obsolescence of existing homes, favored residential building expansion last year.

The average cost per person supplied with new housing in these 310 cities in 1939 was $920.35, a rise of $7.55, or four-fifths of one cent, over the 1938 average of $912.80.

DOTTED LINE ROSCOE .... By Bob Crosby

"It's a bodacious fine range, Maw, but how's Paw gonna git his feet in thet thar warmin' oven?"

Indiana Association Holds Annual Sales Meeting

THE Indiana Gas Association held its Fifth Annual Sales Conference in the Indianapolis Athletic Club, Indianapolis, Ind., Oct. 21. Over 200 persons attended, which exceeded all previous attendance records, according to G. A. Saas, advertising manager, Citizens Gas and Coke Utility, Indianapolis.

E. G. Peabody, sales manager, Citizens Gas and Coke Utility, was program chairman and presiding chairman of the morning session, and Fred Dopke, sales manager, Northern Indiana Power Co., Indianapolis, presided at the afternoon session.

Ed Weston, general manager, Indiana Gas Utilities, Richmond, Ind., and president of the Indiana Gas Association, presented a review of activities and plans for 1941. Frank Ingle, Servel, Inc., introduced the 1941 Electrolux models.

The three other speakers were: G. A. Saas, advertising manager, Citizens Gas and Coke Utility; Joe Rohde, Ruud Manufacturing Co., Pittsburgh, Pa.; and John E. Bogan, New York City.

A moving picture, "Selling America," was shown and a newly organized employes' male chorus of the Citizens Gas and Coke Utility rendered six numbers.

■ ■

A.G.A. Home Service Workers Compile Chart

The Home Service Committee of the American Gas Association recently presented an approved Time and Temperature Chart for use with the CP range to give to homemakers for assistance in cooking. A sub-committee, headed by Jane Roberts of the Roberts and Mander Stove Co., and Edna Mohr of the Pennsylvania Power and Light Co., Allentown, Pa., prepared this chart.

It includes information on top burner cookery, baking, oven meal cookery, roasting, broiling, and oven canning. This chart may be ordered from Williams and Marcus Co., 10th and Lombard Sts., Philadelphia, Pa. Prices of charts with imprints and envelopes are: 500 for $17.50; 1000 for $30; each additional 1000 is $27.50, F. O. B. Philadelphia.

■ ■

Canadian Newspaper Shows Uses and History of Gas

A Toronto, Canada, newspaper, *Saturday Night*, recently devoted an entire section of the paper to the different ways in which natural gas is helping win the war. This edition is supplemented by many pictures of various articles being manufactured by using gas, and other industries in which gas plays an important part.

The history of the natural gas industry in Canada is outlined and statistics shown.

■ ■

Appliances Shown at Fair

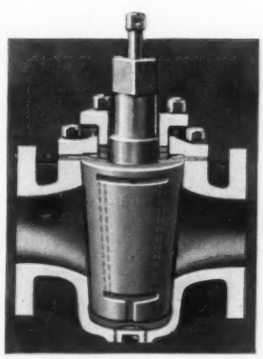
The natural gas companies serving the greater Pittsburgh (Pa.) area recently used 600 sq. ft. of floor space at the Allegheny County Fair to display CP ranges, gas refrigerators, circulator heaters and to put on a specially developed puppet show on circulator heaters.

■ ■

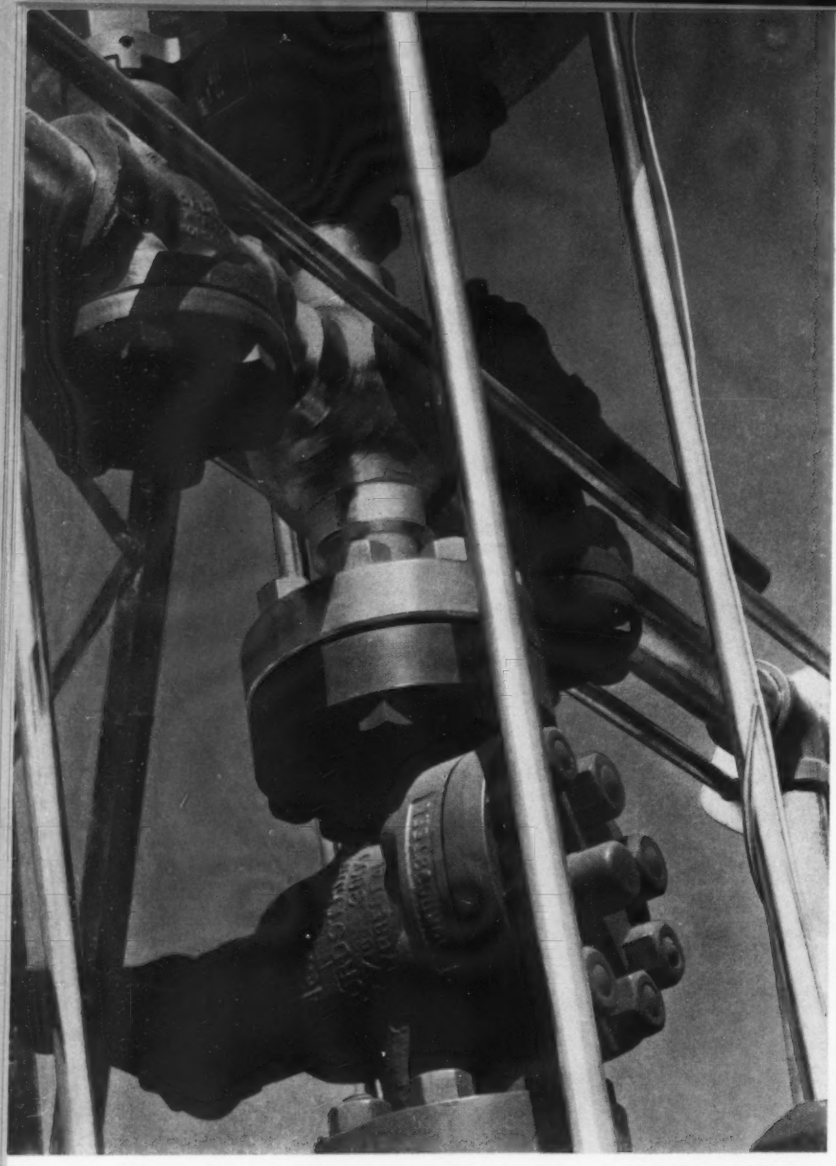
Cyr Gas Company Sold

The Cyr Gas Co., Prescott, Kan., owned and operated for eight years by Jack Cyr was recently sold to S. J. Laughlin. The Cyr Gas Co., which was started eight years ago, serves Rich Hill, Hume, Fulton, Prescott, and Mapleton, Kansas.

...it can't be done! Stand an egg on end? *Preposterous!* But Columbus was unperturbed. He deftly brought the egg down on the table, cracking it slightly at the bottom. The skeptics were amazed, for *there it stood.* ¶ Instinctively, it seems, Nordstrom Valve engineers have the knack of doing the *impossible.* Miracle valve accomplishments have been attained again and again as a result of Nordstrom ingenuity and initiative. *For instance:* Nordstrom pioneered the first successful lubricated plug valve. Nordstrom has built the largest plug valves, (30″). Nordstrom has developed the only types of valves with lubricants capable of operating at temperatures of 950° F. Nordstrom brought forth Hypreseal, the only plug valve that can take test pressures up to 15,000 lbs. per square inch. Nordstrom introduced new brittle-resistant alloys for temperatures of -150°. And again Nordstrom has cast precedent aside by *Merchroming* valve plugs and bodies with a continuous hard-facing for use in high temperature service and for corrosive and erosive conditions. The "toughest jobs" eventually come to Nordstrom; proof enough these valves meet *all* your needs.

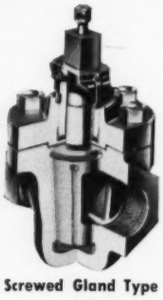


When it can't be done* NORDSTROM *does it!

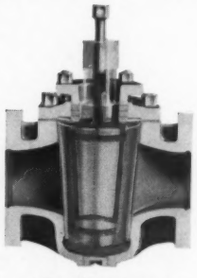


KEEP UPKEEP DOWN

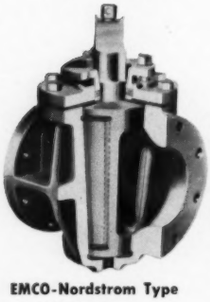
with these ALL-PURPOSE VALVES



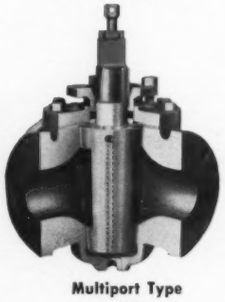
Screwed Gland Type
4" and Smaller



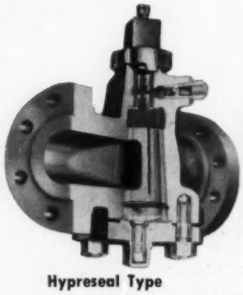
Bolted Gland Type
4" and Larger



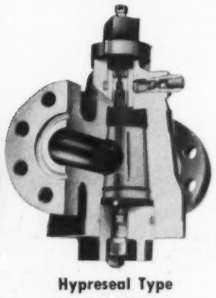
EMCO-Nordstrom Type
4" and Larger



Multiport Type
3 and 4-Way



Hypreseal Type
Flanged Bottom
Rectangular Opening



Hypreseal Type
Screwed Bottom
Round Opening

Descriptive Bulletin upon request.

DYNAMIC PERFECTION IN NORDSTROMS

All valves embody a dynamic principle. But dynamic *perfection* is a rare achievement. Its accomplishment in Nordstrom Valves marks one of the milestones in engineering progress. Comprised essentially of a plug and body, Nordstroms utilize the simplest dynamic principle—that of turning a movable member within a sealed chamber. Nordstroms present the perfect application of the principle. With "Sealdport" lubrication and numerous other engineering advancements, Nordstorm Valves offer a cut-off control which is positive and as complete as though the line was sealed with a welded blank or blind. Incidentally, the practice of using blanks or blinds in connection with valves is totally unnecessary where Nordstroms are installed. The diversified use of Nordstroms on gas, oil, mud and chemical lines with working pressures, in some instances, running to 7500 lbs. and temperatures up to 950° F., is indicative of their perfection.

Nordstrom LUBRICATED VALVES

Sealdport Lubrication

MERCO NORDSTROM VALVE COMPANY—*a Subsidiary of* Pittsburgh Equitable Meter Company

WORLD'S LARGEST MANUFACTURERS OF LUBRICATED PLUG VALVES; GASOLINE, OIL & GREASE METERS

Main Offices: 400 Lexington Ave., Pittsburgh, Penna.

BRANCHES: New York City, Buffalo, Philadelphia, Columbia, Memphis, Chicago, Kansas City, Des Moines, Tulsa, Houston, Los Angeles, Oakland.

CANADIAN Licensees: Peacock Bros., Ltd., Montreal. • *EUROPEAN Licensees:* Audley Engineering Co., Ltd, Newport, Shropshire, England

PRODUCTS: Nordstrom Lubricated Valves; Air, Curb and Meter Cocks • Nordstrom Valve Lubricants • EMCO Gas Meters • EMCO-McGaughy Integrators EMCO Regulators • Pittsburgh Meters for Gasoline, Grease, Oil, Water and other Liquids • Raybould Couplings • Stupakoff Bottom Hole Gauges

Southern Natural Begins Work on Chattanooga Line

THE Southern Natural Gas Co., Birmingham, Ala., will begin Nov. 20, construction of a pipe line from its line at Rome, Ga., to Chattanooga, Tenn., to furnish gas to the Chattanooga (Tenn.) Gas Co.

The plan is for the Southern Natural Gas Co. to deliver natural gas to the Georgia-Tennessee State line where it will be picked up by the Chattanooga Gas Co. and distributed over the city. The Chattanooga company already has a 6-in. line constructed to serve about 100 homes and this line will act as a high pressure feeder line to carry the gas to the city.

A. J. Goss, vice president and general manager of the Chattanooga company, stated that the proposed rates would mean an annual saving of $135,000 a year to present gas consumers in the town.

The Federal Power Commission recently extended time to the newly organized Tennessee Gas and Transmission Co. to present its plans for the building of a new $20,500,000, 800-mile line from Louisiana to Chattanooga. This line would also serve Middle and East Tennessee and Western North Carolina.

■ ■

San Diego Gas and Electric Voluntarily Reduces Rates

The San Diego Gas and Electric Co., San Diego, Calif., recently made a voluntary reduction of $74,363 annually to its domestic and commercial gas customers. This is the sixth rate reduction in five years.

The company also received approval from the Securities Exchange Commission, Oct. 3, for the replacement of 62,925 shares of $100 par value 7% preferred stock with 314,625 shares of 5% stock of $20 par value. This stock exchange will involve more than 2800 shareholders, according to William F. Raber, president.

■ ■

Nebraska Gas Company Sold

Loran L. Laughlin recently took over the natural gas business in the towns of Alma and Ragan, Nebr., from the Aksarben Natural Gas Co., Oxford, Nebr. It is now called the Alma Natural Gas Co., according to Mr. Laughlin.

A. G. A. Releases Tentative Standards for Gas Burning Equipment in Power Boilers

A SET of installation requirements for gas-burning equipment in power boilers has been printed in tentative form and distributed to all gas company and manufacturer members of the American Gas Association, according to a release received from R. M. Conner of the A. G. A. Testing Laboratories. The requirements were compiled by a subcommittee under the direction of R. E. Ramsay, industrial sales engineer, the United Gas Improvement Co. The committee was formed at the instigation of R. B. Harper, chairman of the Approval Requirements Committee.

This set applies to boilers furnishing steam or hot water for either heating or power purposes, the installation of which is not covered by the A. G. A. Requirements for House Piping and Appliance Installation, or by the American Standard Requirements for Installation of Conversion Burners in House Heating and Water Heating Appliances. Further, these requirements do not apply to boilers designed for gas fuel only, or where the necessary burners and accompanying accessories are installed at the factory and shipped as integral parts of the boiler.

Divided into five parts, Part I defines the scope of these requirements and states the specifications for proper ventilation of the boiler room, accessibility for cleaning and inspection, flues and flue connections, and vents for boiler baffles.

Part II, Installation of Burners and Controls, specifies correct installation of the main burners, pilots and necessary controls, safe operation being the prime factor considered. The use of atmospheric type burners, natural, induced, and forced draft burners and power burners are covered in these provisions.

Proper sizes, materials, and installation of gas piping and meters are covered in Part III. Formulae developed to determine the proper size of piping are included in this section. As an additional factor of safety, a correct method for testing such pipe systems for tightness and a method for purging prior to operation, are given.

Rounding out these specifications, Part IV, Inspection and Tests, deals with the safe and satisfactory operation of the assembled gas-burning unit. Various inspection procedures and tests are described which assure satisfactory burner and pilot operating characteristics when the unit is placed in continuous service.

Copies of these requirements may be secured through the A. G. A. Testing Laboratories, 1032 East Sixty-second Street, Cleveland, Ohio.

■ ■

Colo, Iowa, To Have Gas

Colo, Iowa, recently voted to grant a franchise to the Iowa Electric and Power Co., Cedar Rapids, Iowa, to supply the city with both gas and electricity. A line will be laid from Nevada, Iowa, to carry the gas.

The largest gathering of gas appliance dealers in the history of the industry in Southern California swarmed into the Los Angeles Breakfast Club on September 13, defying the bad luck usually associated with the day, to inaugurate a Fall CP gas range campaign in this area. It is estimated that 3200 dealers and members of their families enjoyed the outdoor barbecue dinner donated by Southern California and Southern Counties Gas Companies, and sat in on the sales rally which was held outside the breakfast club under a bright Southern California moon following the dinner. Bob Agee, dynamic A. G. A. E. M. sales promotion man, was the star performer of the evening. Feature of the current campaign here is a special trade-in allowance amounting to 20 per cent of the retail purchase price of the new appliance.

A. G. A. Distributes Pamphlet on Revision Of Gas Water Heater Standards

THE Subcommittee on Approval Requirements for Gas Water Heaters and Listing Requirements for Attachable Water Heating Units recently completed for criticism tentative revisions to the American Standards under its jurisdiction. On October 10, 1940, these two sets of specifications were mailed to all gas water heater manufacturers, gas companies and other interested individuals.

Of particular interest to manufacturers and gas companies are recommended revisions to the current American Standard Approval Requirements for Gas Water Heaters permitting the approval of single faucet type water heaters without draft hoods and still retaining all essential safety features for that type of installation.

Such heaters must be equipped with automatic pilots and with a single faucet so attached and made a part of the appliance that no other water outlet could be attached for distant operation of the water-gas valve. A third essential requirement specifies that satisfactory combustion must occur with the flue outlet completely blocked to preclude any hazard resulting from the operation of this type of appliance.

Specifications on automatic pilots incorporated in water heaters were strengthened in line with the latest edition of the American Standard Listing Requirements for Automatic Pilots, Z21.20, 1940. As an added factor of safety, where a push-button or trigger type valve is used on an automatic pilot to permit opening the gas supply to the main burner for ignition purposes, such valves are required to be constructed without latching in the open position.

In another revision the Subcommittee on Test Gases and Test Pressures provides recommendations for various performance tests with mixed natural and coke oven gas of 800 B.t.u. per cu. ft. content. Similar applicable revisions were incorporated in the current requirements for attachable gas water heating units.

In order that all comments from the industry may be considered by the subcommittee at its next meeting, which is tentatively scheduled to be held before the end of the calendar year, criticisms should be submitted to the subcommittee in care of the American Gas Association Testing Laboratories, 1032 East Sixty-second Street, Cleveland, Ohio, on or before December 1, 1940, It is anticipated that these two sets of specifications will be completed in time to set the effective date as of January 1, 1942.

■ ■

Mississippi Power and Light Extends Jackson Facilities

Improvements and extensions on the distribution system at Jackson, Miss., are being made by the Mississippi Power and Light Co., Jackson, Miss., to serve additional customers in and near Jackson.

The 27 construction projects, totaling $25,000 include: construction of 20,545 ft. of new mains; replacing 1600 ft. of mains and the installation of a regulator station. They are also building 780 ft. of extensions in Yazoo City to serve seven domestic consumers and for floor furnaces and automatic water heaters in 16 new FHA houses.

Work is nearly completed on the construction of a local distribution system in Raymond, Miss., following the granting of a 25-year natural gas franchise to the Mississippi Power and Light Co., Jackson, Miss. *(G A S*, Aug., 1940, p. 22.)

■ ■

Natural Gas Discovered at Bottineau, North Dakota

Dr. J. A. Johnson, mayor of Bottineau, N. D., recently discovered natural gas in the town's water system when he lit a match to investigate the cause of bubbling water in his residence's lavatory. The resultant "poof" proved that natural gas had been the cause of failure of the water taps to function properly.

The supply of gas has not been determined but it is believed that it is in sufficient quantities to provide enough for the city.

Dr. Johnson plans to pipe the gas from the water pressure tank and use it to heat the water.

■ ■

Geological Survey Map of Sweetwater County, Wyo.

A map showing the areal and structural geology of the northern part of Baxter Basin gas field in Sweetwater County, Wyo., was recently issued by the Geological Survey, U. S. Department of the Interior. The map shows an area of 184 square miles in the central part of the county.

■ ■

Boeing Plane Co. Uses Gas

Upon completion of its new plant now being built to aid in supplying the new demand for more planes, the Boeing Airplane Co., Seattle, Wash., will use approximately 6,000,000 cu. ft. of natural gas per month for heat treating. The gas will be furnished by the Seattle Gas Co.

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The "inside story" of PAYNE House Heating Equipment is a story of many innovations in design...Twice-Tested in rigid "Proving Grounds." ☆ These PAYNE "exclusives" assure permanent owner-satisfaction ...and every satisfied gas furnace owner increases your load! ☆ That's why Gas Companies throughout the Nation recommend...merchandise... and sell vented PAYNE Furances.
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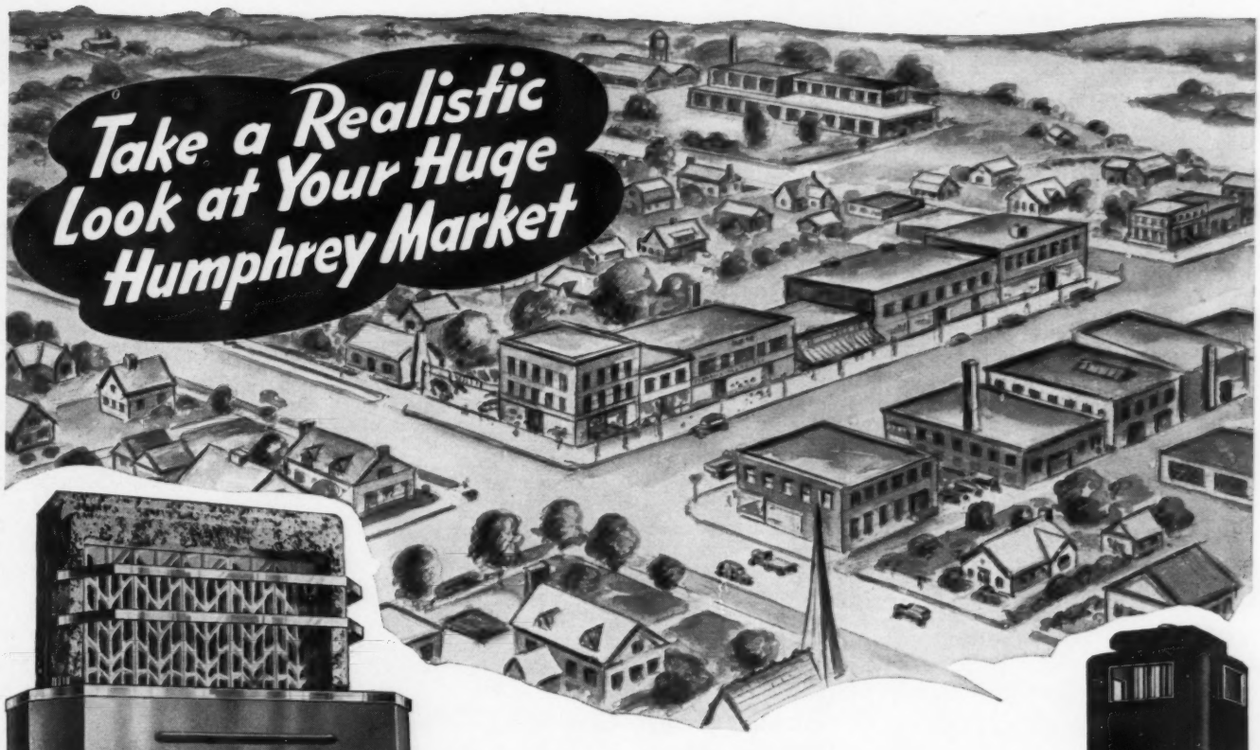
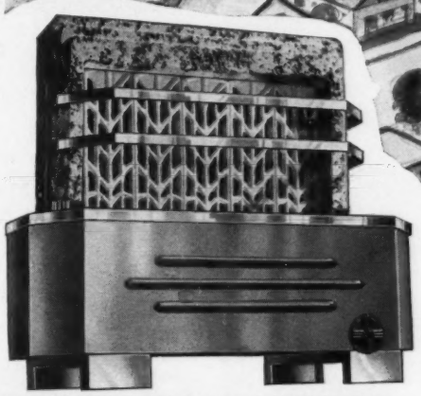
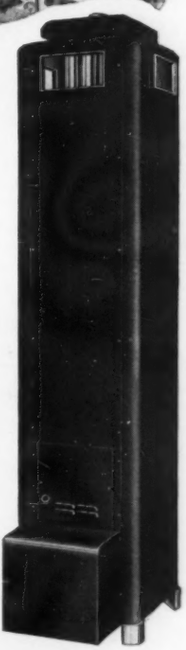




HUMPHREY RADIANTFIRE

Smart new models at low prices make this popular home type heater an excellent mass selling item for employee campaigns.

Every one of the typical buildings shown here is a potential gas outlet through the use of one or more Humphrey appliances. Systematic canvass and aggressive selling with the helps we provide can add vast new loads for you this heating and lighting season. Have you made a recent appraisal of your Humphrey "market"? Send for the 1940-41 Cooperative Selling Material and complete information about these consistent load-builders.

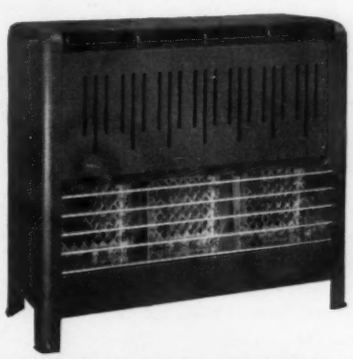


HUMPHREY HEAT TOWER

Many a small home is heated completely and comfortably with this remarkable Humphrey development. Takes only 19" x 28" floor space, provides fan-forced circulating heat. There is also a model for heating offices.

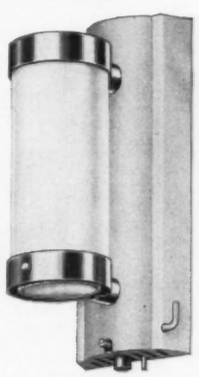
HUMPHREY GAS UNIT HEATER

With industrial building and expansion on the upswing there are hundreds of places in every community where these heaters are needed now.



HUMPHREY RADIANT-FIRE CIRCULATOR

This new Open-Front circulating heater is selling in ever increasing volume for home and commercial use. Three models meet the varying needs.



HUMPHREY OPALITE

Gas lighting becomes modern and efficient with this new type of lighting fixture.

GENERAL GAS LIGHT COMPANY

KALAMAZOO, MICHIGAN

23 Warren St., NEW YORK CITY 2nd Unit Santa Fe Bldg., DALLAS 475 Eleventh St., SAN FRANCISCO

Pacific Gas & Electric Rate Reductions Total $5,000,000

PACIFIC Gas & Electric Co., San Francisco, Calif., last month announced reductions of $3,000,000 annually in natural gas bills, and $2,000,000 in electric bills.

The new natural gas schedules, effective October 22, not only reduce rates substantially but also shorten the usage blocks, on which there are progressively lower rates, thus giving the customers the added advantage of automatic decreases in price much faster than heretofore.

In San Francisco, monthly bills for 3000 cu. ft. will drop from $2.40 to $2.08; for 4000 ft., from $2.93 to $2.54; for 5000 ft., from $3.46 to $3.00, etc. The resultant savings to customers will approximate $770,300. Other communities will also effect similar savings.

With the recent reductions, the P. G. & E. has a record of eight major rate cuts in less than five years — four in natural gas and four in electricity. Computed on usage at the time they were made, the electric cuts now aggregate $11,244,000 annually and the gas cuts $8,633,000, or a total saving to customers of $19,877,000.

■ ■

United Gas Line To Serve Enlarged Army Station

The United Gas Pipe Line Co., of Shreveport, La., recently completed the laying of a pipe line to Brooks Field, United States Military reservation in San Antonio, Texas, to serve the 18 new barrack buildings, four recreation halls and four mess halls with natural gas.

In the construction of the line it was necessary to clear 2400 ft. of right-of-way, bore one road crossing and lay 4400 ft. of 4-in. tap line to the measuring station site. A ditching machine was used in the construction.

Brooks Field served as a primary aviation training school at the end of the World War, but the completion in 1930 of Randolph Field resulted in the removal of the primary training school to that field.

The National Defense Program and resultant enlargement of the army air corps is responsible for the current expansion program.

■ ■

Recycling Plants Conserve Gas Supply In Texas

There are 25 recycling plants operating in the state of Texas which handle an average of 766,376,000 cu. ft. of gas daily, according to news reports. Out of the total of 766,376,000 cu. ft. processed, the repressuring plants returned 669,698,000 cu. ft. to the ground. The gas comes from 137 gas wells, and is repressured through 53 injection wells.

There are also 148 casinghead gasoline plants as distinguished from recycling plants, in operation, using 712,704,000 cu. ft. of sweet gas and 671,048,000 cu. ft. of sour gas, according to the reports.

■ ■

Another Huge Gas Well

The Ohio Fuel Gas Co., Columbus, Ohio, recently drilled in a gas well in Athens County, Ohio, with an estimated production of from 30 to 44 million cu. ft. daily. Gas was reached at about 500 ft. The company has leases on 3500 acres in this locality, according to news reports.

FULTON
Cut-Out-Latch Regulator

Failure of Gas Holds No Hazard

If pressure drops below the set minimum on any line where the Fulton Cut-Out-Latch Regulator is installed, the latch automatically shuts and locks the valve. Flow will not resume till the operator opens the valve by hand. Users of low-pressure furnaces and burners protect their equipment at little cost by adopting this safeguard. Approved by insurance companies. Write for Bulletin 2987.

Dependable C-F Regulators are offered for all requirements of pressure control.

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28-40 PENN AVE. CF PITTSBURGH, PA.

Three Gas Companies Subject To Regulation

THE Federal Power Commission determined Oct. 21, that Billings Gas Co., Billings, Mont., The Ohio Oil Co., Findley, Ohio, parent of the Billings company, and Mountain Fuel Supply Co., Salt Lake City, Utah, are natural gas companies within the meaning of the Natural Gas Act and therefore subject to the provisions of the Act and the rules and regulations of the commission.

The three companies filed applications with the commission requesting a determination of their status, taking the position that the nature of their respective natural gas business is such as to exempt them from provisions of the Natural Gas Act.

The commission's opinion states there is a continuous flow of natural gas in interstate commerce. The Billings Co. purchases gas produced in Wyoming from The Ohio Oil Co. at the Wyoming-Montana state line and there is unbroken transmission from the termini of Wyoming gathering lines to points of ultimate public consumption in Montana. As to the Ohio company, the commission held that the natural gas transmitted from the Elk Basin Field in Wyoming to the Billings company line in Montana is in effect a continuation within the State of Montana of the interstate transmission begun in Wyoming. The Mountain Fuel Supply Co. produces gas in Wyoming and Colorado and owns and operates a transmission system carrying gas for sale in various communities, including points within the State of Utah. This, the commission held, constitutes a regular flow in interstate commerce.

■ ■

Michigan Consolidated Adds to Gas Production

The Michigan Consolidated Gas Co., Detroit, Mich., recently made application to the Securities Exchange Commission for authority to spend $750,000 for property consisting of land, gas wells, well-head connections, meter stations, gathering lines, oil and gas leases, gas leases, and contracts covering the sale of gas from the Austin gas field in Mecosta County, Mich.

Reports also stated that the company has obtained an option to purchase additional property in the Austin field for $30,000 and that it also intends to purchase the remaining property in the same area consisting of approximately 1500 acres of land, two gas wells and other property.

■ ■

Panhandle Eastern Plans Move To Larger Offices

The Panhandle Eastern Pipe Line Co., Kansas City, Mo., will occupy three floors of the Midland building, Kansas City, in December. The move will increase the company's general offices by 50%.

J. D. Creveling is president and G. J. Neuner is vice president in charge of operations of the company which was organized in 1929 with 10 employes. It now has a personnel of 100.

■ ■

United Carbon Co. Builds Texas Carbon-Black Plant

The United Carbon Co. recently started construction of a new carbon-black plant about two miles north of Aransas Pass, Texas. It will be completed early next year.

The plant will utilize residue gas from the Natural Gasoline Corp.'s 50,000 M c.f. gasoline plant in the McCampbell field nearby.

Preview of coming campaigns by

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

GAS APPLIANCE SOCIETY OF NORTHERN CALIFORNIA

GAS CIRCULATING HEATER CAMPAIGN

NOV. 1940

A well-thought-out promotional event which coincides with our $3,000,000 rate reduction. Based upon newspaper advertising to be supplied by the P. G. & E. and display advertising supplied by the Gas Appliance Society—the latter including windows cards, bumper strips and a very effective salesman's pocket piece.

All copy stresses the dual theme of proper sizing and economy of operation. Newspaper advertisements carry the headline "In Hats or Heaters—BUY THE RIGHT SIZE"—and illustrates the point with an amusing and attention-compelling drawing. The economy appeal is built upon correct sizing and low gas rates—altogether a powerful and convincing sales story.

See your P. G. & E. office and get started at once in making this campaign your own.

G 211-1140

DEALERS: By watching this page from month to month you can keep informed of sales promotional campaigns to be sponsored by the Pacific Gas and Electric Company and the Gas Appliance Society. Detailed information will be supplied, as usual, through the mail. If such information is not received, call our local office or write Gas Appliance Society, 1355 Market Street, San Francisco, California.

Natural Gas to Aid in Developing Texas Iron

THE Madaras Steel Corp. of Texas plans to use the new Madaras process of iron-ore reduction that is carried on entirely with natural gas, to develop the long-known but never developed iron-ore deposits in East Texas. These deposits are in a section remote from supplies of coke and limestone, which are usually used in the process, and because of the large investment required to install blast furnaces have never been developed.

The Madaras process utilizes no coke or coal, but is carried on entirely with natural gas of which there are large supplies in East Texas. It works at comparatively low temperatures of about 1400° F. instead of the very high temperatures required for blast-furnace reduction. Cracked gases combine chemically with impurities in the ore and flow off, leaving the iron in pure form, ready for processing into steel.

Julius D. Madaras of Detroit, Mich., invented the process after five years of work. It has been tested by the company and pronounced by engineers and directors as satisfactory.

The East Texas deposits are estimated by leading authorities to contain a maximum of 20,000,000 tons of commercially valuable ore, extending through a belt including about 23 counties in the northeast section of the East Texas region.

■ ■

S. C. M. A. Monthly Meeting

The Southern California Meter Association held its monthly meeting at the French Cafe, Montebello, Calif., Oct. 24. Charles M. Fuller, the Los Angeles County Sealer of Weights and Measures, gave a talk on the scope and activities of his department and a new book by M. F. Behar "Temperature Measurement and Control," was reviewed in part by H. P. Saueressig of The Texas Co.

■ ■

Transfusion to Lengthen Life of New York Field

The Belmont Quadrangle Drilling Corp., Bradford, Pa., is planning to store natural gas from Pennsylvania, West Virginia, and the Texas Panhandle in the gas-bearing sands of Schuyler County, N. Y., which it is believed will lengthen the life of the Tyrone-Altay fields for at least 10 years.

According to geologists, this underground storage place is surrounded on three sides by beds of salt and salt water and on the fourth by a hard rock formation. No leakage will result through fissures in the earth, they say. A compressor plant will be finished before winter.

■ ■

P. S. C. Authorizes Stock Sale Of Gowanda Gas Corp.

The Public Service Commission recently authorized the Iroquois Gas Corp., Buffalo, N. Y., to acquire all outstanding capital stock of the Gowanda (N. Y.) Gas Corp. for $234,104.

The commission previously blocked the Iroquois Corp.'s attempt to purchase the stock, consisting of 2440 shares of common without par value, for $500,000, declaring that the price was excessive.

The commission stated that the operations of the Iroquois Corp. substantially surround the territory served by the Gowanda Corp.

Some of the products manufactured in Northwest Arkansas in which gas played a part that were displayed by the Arkansas Western Gas Co., Fayetteville, Ark., during the formal opening of its new home office.

Arkansas Western Opens New Fayetteville Building

THE Arkansas Western Gas Co., Fayetteville, Ark., recently opened its new office building on the tenth anniversary of providing Northwest Arkansas with natural gas service. At the formal opening of the building the company displayed samples of all products manufactured in Northwest Arkansas in which gas played a part.

The building was entirely remodeled and redecorated with a new entrance built and a new inside stairway to the "Hospitality Room" on the second floor.

The ground floor has the display and commercial offices. The display room is set off from the four offices occupied by the superintendent, the billing department, and the sales force, by an oak counter.

The hospitality room on the second floor will accommodate 100 persons and is dedicated to the use of the general public and the chairs are upholstered in dubonnet leather. A completely equipped kitchen is on the stage.

Executives of the Arkansas Western Gas Co. are: Albert S. Johnson, president; C. H. Zachry, vice president and treasurer; and L. L. Baxter, vice president and operating manager.

■ ■

Indiana Gas Utilities Co. May Sell Properties

The Richmond Gas Corp., Richmond, Ind., has asked approval of the Securities Commission to purchase the Richmond division of the Indiana Gas Utilities Co., Terre Haute, Ind., for $550,000.

The application disclosed Ralph H. Beaton, president of the Richmond Gas Corp., has assigned to the new company his contract with the Indiana Gas Utilities for purchase of the properties, and that he is also under contract to purchase the equity securities of the company.

■ ■

Freeport, Illinois, To Have Natural Gas Next June

Freeport, Ill., will have natural gas by June, 1941, following construction of a pipe line to the city by the Natural Gas Pipe Line Co. of America, Chicago, Ill., according to Donald C. McClure, president of the Central Illinois Electric & Gas Co., Rockford, Ill.

SOLVES CONVERSION PROBLEMS

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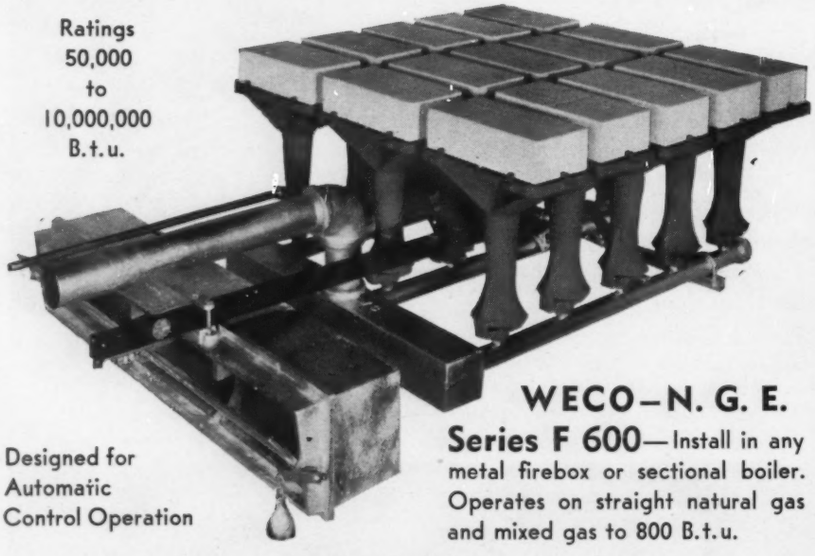

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WECO—N. G. E.

Series F 600—Install in any metal firebox or sectional boiler. Operates on straight natural gas and mixed gas to 800 B.t.u.

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TULSA *Division of* OKLAHOMA

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F. J. Evans Engineering Co., Birmingham, Atlanta and Houston

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We Must Take Care of Our Own!

At this definite Community Chest time — we must meet human needs at home without prejudice to needs of people in war-torn countries.

The Community Chest is an indispensable line of defense against social needs that decrease dependency.

The Community Chest offers the best way to fight "enemies within" — discouragement, social unrest, delinquency, disease, poverty.

Community Chest agencies are geared to give preventive, constructive, and remedial services which mass government relief cannot and does not provide our families and dependent children.

Help to take care of our own by Giving Generously to your

COMMUNITY CHEST

OIL & GAS
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Reg. U. S. Pat. Off.

• **THE READER'S ATTENTION is called to the coupon in the lower right-hand corner of this page. This coupon is printed for the reader's convenience and will enable him to obtain with minimum effort further information on any of the items or catalogs listed in this department. All he has to do is to "ring" on the coupon the number that corresponds to the number printed over the item in which he is interested, clip out the coupon, and mail it to GAS, 1709 West Eighth Street, Los Angeles, Calif. — Editor.**

For more information **"ring 3930"** on coupon

Gage

Trade Name: Duragauge.
Application: For mud pumps.
Features Claimed: It is easy to read. Made with a suppressed scale, it has open readings over the entire working range. The case is moisture-proof and dust-proof. It has a non-breakable front. It has a 2-in. male bottom connection for screwing directly on the pipe line. The heavy steel bottom part may be removed for cleaning out, if necessary, without affecting the gage itself. It is not affected by vibration nor changes in temperature. It is as accurate in zero weather as at 100° F. Accuracy guaranteed to within 1% of the scale range. Standard ranges: 0 to 1500, 0 to 3000, and 0 to 5000 lbs.
Description: This new gage is made with a fluid filled system and with a non-corrosive stainless steel bulb.—*Ashcroft Gauge Division, Manning, Maxwell & Moore, Inc., Bridgeport, Conn.*

■ ■

For more information **"ring 3931"** on coupon

Whiteprint Machine

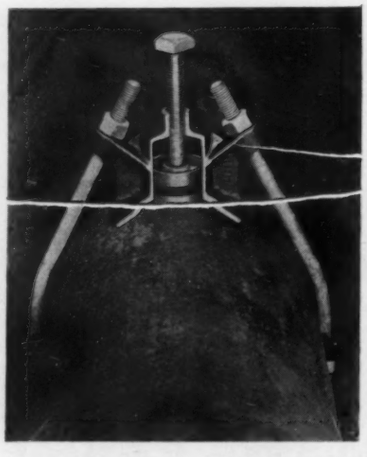
Trade Name: Ozalid Model "F" Whiteprint Machine.
Application: This constitutes a printer and dry-developing unit built into a single, compact machine in which are incorporated all the facilities necessary to turn out dry-developed Ozalid Whiteprints.
Features Claimed: Equipped with a new type high pressure mercury vapor lamp, which uses 40 watts per in. and has an active length of 46 in., the model will print Ozalid sensitized materials at speeds up to 56 in. per minute. The lamp gives uniform light distribution over the entire printing surface and is guaranteed for 1000 hours, but tests have proven a life of from 1500 to 2500 hours. Lamps which burn out can be easily replaced. An adjustable light shade allows the operator to vary exposure without changing the printing speed. Even cooling of the lamp which is necessary for uniform light distribution, is provided by a two-stage blower and specially designed air duct. A Veeder-Root Counter automatically registers the number of hours that the machine operates. This enables the operator to determine at a glance exactly how long the machine has been in operation. — *Ozalid Corp., Johnson City, N. Y.*

■ ■

For more information **"ring 3932"** on coupon

Vented Plug Clamp

Trade Name: Skinner-Seal Vented Plug Clamp.
Application: For shutting off leaks on high pressure pipe lines.
Features Claimed: Pressure "vents" while clamp is being placed in position so that the piston plug shuts off the leak easily and quickly without chance of injury to the worker or of damage to the pipe.
Description: The head of the clamp consists of a malleable iron cylinder resting on a pressure-distributing base. This is anchored to the pipe by bolts and strap. The cylinder is fitted with a rubber-faced metal "piston," operated by a heavy thrust screw-gasket surface 2 3/16 in. diameter. To prevent "burning" of gasket in the last stages of shutting off, the lower rim of the gasket is armored with a brass band. This also keeps rubber from escaping through vent. Bottom of gasket is ground to fit curvature of pipe, and piston is keyed in the cylinder to prevent rotating out of position while thrust screw is being tightened. — *M. B. Skinner Co., South Bend, Ind.*



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For more information **"ring 3933"** on coupon

Hose Reel

Trade Name: Schramm Live Hose Reel.
Application: For use on the Schramm portable and stationary air compressors.
Features Claimed: Easily mounted, fitting any 1½-in. female pipe thread. Has built-in valve construction, with side members spun and welded to the hub for extra strength. Bronze bushings support the reel to give free turning under all conditions. Designed so that 3 ft. or the entire 50 ft. of hose can be pulled from the reel and the valve then opened to allow air or water to enter the hose. The valve is self-sealing, with no adjustments or packings, no stuffing boxes, and yet is leakproof.
Description: Reels come in two styles, one with flat sides for wall mounting or for concave air tanks, and the other with one flat side and one concave side to fit over convex end of air tanks. Made in several capacities for air, water, or gases. — *Schramm, Inc., West Chester, Pa.*

■ ■

For more information **"ring 3934"** on coupon

Synthetic Tubing

Trade name: Koroseal Hose.
Application: For use in chemical laboratories and plants, in electrolic ore reduction plants and other electro-chemical metal refineries and in photographing, developing and printing plants.
Features Claimed: The hose shows durometer hardness 70 to 78 at 85° F.; specific gravity, 1/31; working pressure, 50 lbs. at temperatures up to 120° F. Recommended working pressure of 50 lbs. per sq. in. is based on a safety factor of 5. The hose is free from sulphur and can be attached to brass, silver, etc., without corrosion of the

This coupon will bring you further information, catalogs, etc., concerning products described in the Oil & Gas Equipment Review Department of GAS. "Ring" the numbers of items which interest you, sign and mail this coupon to **GAS, 1709 West Eighth Street, Los Angeles, Calif.**

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3940 3941 3942 3943 3944 3945 3946

November, 1940

Name.....**Position**.....
Company.....
Address.....
City.....**State**.....

metal. It does not swell in oil, many or other solvents of rubber, is not affected by strong corrosives, practically impermeable to gas diffusion and does not absorb moisture. Practically free from deterioration due to aging, ozone or other oxidation, including such strong oxidizing agents as potassium permanganate, chromic acid, hydrogen peroxide, sodium perborate, the hose should not be used in contact with food products, and softens in temperatures above 150° F.

Description: Koroseal is plasticized polyvinyl chloride, whose basic materials are coke, limestone and salt. The new hose is dull black in color and is made without fabric or other wall reinforcement. It is stocked in inside diameters ranging from ⅛ in. to ½ in. and 1/16 in. to ⅛ in. wall thicknesses and in all sizes up to 3 in. outside diameters.—*The B. F. Goodrich Co., Akron, Ohio.*

■ ■

For more information **"ring 3935"** on coupon

Protectoglo

Trade Name: Brown Protectoglo.

Application: For protection against failure of oil, powdered coal, and luminous gas flames.

Features Claimed: This photo-electric principle differs from the other Brown Flame-Electrode Protectoglo System by using a light emitter to detect the presence of a flame. In operation, the light from the flame is directed upon a photo cell. This results in a small flow of current through the cell which is amplified by a vacuum tube circuit until of sufficient magnitude to close a relay. Through the relay contacts, the main fuel valve is energized. The response of the system to flames of different luminosity may be changed on the job by means of a sensitivity adjustment. With this adjustment in the maximum position, the unit will easily respond to the light of a candle, while the other extreme, no amount of light will close the relay. To prevent transient flame disturbances from causing unnecessary shut-downs, the system has been designed to provide a time lag in the relay operation. This lag can be varied from zero to 10 seconds. All high impedance components of the circuit are supported on isolantite insulation. The unit is supplied with a swivel mounting which can be screwed to a 1¼-in. pipe supported from the floor. —*The Brown Instrument Co., a Division of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.*

■ ■

For more information **"ring 3936"** on coupon

High Pressure Meter

Trade Name: 1-in. Bassler Meter.

Application: For measuring the production of individual oil wells, or for use on gathering lines.

Features Claimed: It is built to withstand high pressures up to 1000 lbs. per sq. in. to handle flows direct from the well.—*S. F. Bowser & Co., Inc., Fort Wayne, Ind.*

■ ■

For more information **"ring 3937"** on coupon

Automatic Control

Application: For gas engine compressors used in refrigerating natural gas which is being liquefied.

Features Claimed: The controllers keep the refrigeration developed by the compressors in accurate step with the amount of gas being liquefied.—*Clark Bros. Co., Inc., Olean, N. Y.*

Before You Buy, Consult
the
Latest Trade Literature
Concerning Equipment

This department of GAS will gladly mail you without obligation any of the selected bulletins listed below. Use the coupon on page 68 of this issue, indicating by number above those you desire.

For more information **"ring 3938"** on coupon

Descriptions of the application of packers, liner hangers, and bridging plugs, and complete tables in sizes, weights, parts, and operation are given in the Lane-Wells Co. new bulletin.

For more information **"ring 3939"** on coupon

In the Garlock Packing Co.'s new booklet, the construction of lattice-braid packing is fully explained and the several types and kinds of materials in which lattice-braid is available are described.

For more information **"ring 3940"** on coupon

GEA-3345, a General Electric bulletin, describes the advantages of synchronous motors for part-winding starting.

For more information **"ring 3941"** on coupon

Bulletin No. 82, published by the Star Drilling Machine Co., describes the functions of the Speed Star including top-to-bottom drilling, swabbing, and all the work of cleaning out oil, gas, and water wells.

For more information **"ring 3942"** on coupon

The Cochrane Mechanical Flow Meter is covered in Publication 2094, recently issued by the Cochrane Corp.

For more information **"ring 3943"** on coupon

A new catalog of correctly designed safety clothing has just been published by the Industrial Gloves Co., featuring widely used and approved industrial safeguards.

For more information **"ring 3944"** on coupon

Single sheet bulletins under name of Form D-1, D-4, D-5, D-9, and D-10 concern five flow diagrams which will be reproduced by the Koppers Co.

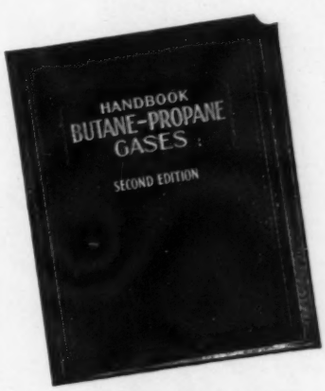
For more information **"ring 3945"** on coupon

The George A. Nelson Sales Co. has issued Bulletin No. 101 on the Pierce Hydraulic Car Mover, designed to move loaded and empty railway cars.

For more information **"ring 3946"** on coupon

Catalog No. 1773, prepared by the Blaw-Knox Co. on its electroforged steel grating and stair treads. The booklet illustrates a diverse range of uses, and contains a table of safe loads and size variations.

HANDBOOK BUTANE-PROPANE GASES



415 Pages

CONTENTS: Semi-Bulk Distribution: Use of Butane in Buses: Combination Propane Operated Utility Plant: Use in Internal Combustion Engines: Design and Installation of Storage: Supply from Petroleum Refineries: Engineering Data on the Lower Olefins: Domestic Appliance Testing and Utilization: Economical Comparisons with Coal, Oil, Electricty. Producer Gas, Manufactured Gas: Town Plants: Manufacture from Natural Gas: Specal Uses: Volume Correction Factors: Transportation: Use with Other Gases: Analysis and Testing: Properties of Mixtures: Bottled Gas Distribution: Bibliography: Central Plant Directory: Catalog Section.

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The Natural Gas Magazine

BUTANE-PROPANE
News
1709 W. 8th Street
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CURRENT Reading

Welding Procedure and Practice for Mild Steel — W. L. Archer. *Refiner*, Aug., 1940, pp. 79-81. Author defines mild steel, and explains the recommended procedure for welding it.

New Plant Indicates Recycling Not Limited to Large Properties — R. C. Fish. *Petroleum Engineer*, Aug., 1940, pp. 99-102. Distillate separation based on low-pressure equilibrium principle proves efficient in small-capacity Cayuga, Texas, installation.

Line Current Calculations May Be Performed Graphically — W. G. Wilson. *Oil Weekly*, Aug. 19, 1940, pp. 26, 27. The chart shown in this article is a time-saver in obtaining pipe line current survey data for use in cathodic protection of pipe lines.

Recycling Plant Owner Selects High-Pressure Absorption — F. H. Love. *Petroleum Engineer*, Aug., 1940, pp. 55, etc. New installation of Hunt Oil Co. in Long Lake field, Texas, operates at 1500-lb. processing pressure and returns gas at 2150 lb. Described and illustrated.

Manual of Industrial Health Hazards — Joseph B. Ficklen; 176 pages; cloth; charts, tables, and color plates; published by *Service to Industry*, P. O. Box 133, West Hartford, Conn.; $4 postpaid. The author, chemical engineer affiliated with the Travelers Insurance Co., presents a practical approach to evaluating industrial hygiene exposures resulting from 94 dusts, vapors, and gases. Included is a large chart of potential health hazards in 108 manufacturing classifications.

What Will Inflation and Devaluation Mean to You? — Donald G. Ferguson and others; 144 pages; paper; charts and tables; published by the American Institute for Economic Research, 54 Dunster St., Cambridge, Mass.; $1. Non-technical, informative study of the causes and effects of inflation, reported to be under way in the United States, and devaluation, which usually is the result, and of what to do about them.

Fourteenth Biennial Report — Department of Conservation, State of Louisiana, 1938-1939. Louisiana Geological Survey, pp. 211, etc.

Gas Recycling Plant at Long Lake Shows Good Product Yield — George Weber. *Oil and Gas Journal*, Aug. 29, 1940, pp. 59, etc. Hunt Oil Co. recently placed in operation a high-pressure absorption plant and pressure maintenance system in the Long Lake field of East Texas. By means of efficient absorption and reabsorption of the condensate fraction in the high-pressure gas, a good recovery is maintained on gasoline and distillate products. The plant began initial operation June 21, after an 84-day construction period. It is designed to process 55,000,000 cu. ft. of gas daily. Describes the plant and its operation.

Bureau of Mines Technical Paper 612, Explosion Hazards in Storage Battery Rooms—G. W. Jones, John Campbell, R. E. Dillon, and O. B. Benson, may be purchased from the superintendent of documents, Government Printing Office, Washington, D. C., price 10c. The investigation showed that the concentration of hydrogen in battery rooms was low and no hazards were involved when the batteries were idle, "on float." Under this condition, the concentrations of hydrogen varied from zero to a maximum of 0.29%. The only cases where hazardous concentrations of hydrogen were present were during the periods when the batteries were being charged and more especially toward the end of the charging period. The highest average concentration of hydrogen in any battery room tested was 5.35% and was in the explosive range of hydrogen-air mixtures.

Heats of Formation of Gaseous Hydrocarbons — F. D. Rossini. *Chemical Reviews*, Aug., 1940, pp. 1-16. The existing data leading to values of the heats of formation of hydrocarbons in the gaseous state are discussed. "Best" values are given for the heats of formation of eight paraffin hydrocarbons (through the pentanes), sixteen olefin hydrocarbons (through the pentanes), and three acetylene hydrocarbons, all in the gaseous state. Regularities and irregularities in the heats of formation, and their changes with structure, are discussed.

New Recycling Plant Departs From Conventional Processing — F. H. Love. *Petroleum Engineer*, Sept., 1940, pp. 86, etc. In the La Rosa field, Refugio County, Texas, the Coronado Corp. has completed and is now operating its 46,000,000 cu. ft. recycling plant. The products of the plant, which is operated on the absorption principle, at present are stabilized distillate and butane, although the design is such that all grades of motor fuel, special solvents, propane, butane, kerosene, naphthas and natural gasoline can be manufactured. A two-compartment dephlegmator operates at 40 lbs., producing naphtha overhead for blending with butane-free gasoline. A flow sheet of the plant is shown.

Efficient Communication System for Pipe Line Operation — Hezzie Clark. *Oil and Gas Journal*, Sept. 19, 1940, pp. 84-85.

Pipe-to-Soil Potentials in Cathodic Protection Systems — W. F. Rogers. *Petroleum Engineer*, Sept. 1940, pp. 33, etc. Data indicate potential of normal steel pipe to copper sulphate electrode approximates 0.54 volts; studies reveal voltage "build-ups" is too erratic to be reliable.

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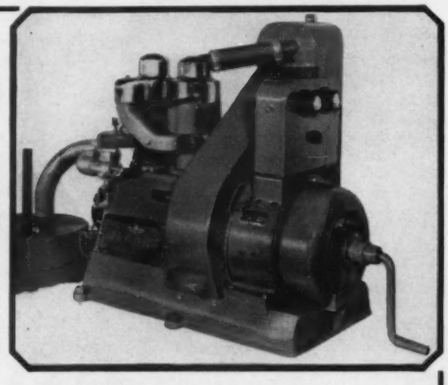

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PIPE LINE DIVISION — MINNEAPOLIS, MINN.

Change Planned In Proposed Kansas To Milwaukee Line

THE Federal Power Commission on October 11 allowed the filing by the Western Natural Gas Co., Kansas City, Kan., of an amended application for permission to construct a natural gas pipe line from the Hugoton field in Kansas to Milwaukee, Wis. Consolidated hearings on the application and on a similar application of the Independent Natural Gas Co., Bartlesville, Okla., is now in progress at Madison, Wis. The cost of the proposed line, according to the applicant's estimate, is reduced from approximately $30,000,000 to $25,208,154, the main line now being estimated to cost $17,124,304, instead of $23,255,250. The amended proposal is based on construction of a 26-in. main pipe designed to carry gas at gage pressures of approximately 510 lbs. per sq. in. as against the earlier computation on the basis of a 24-in. line of high pressure pipe carrying pressure of 610 lbs. or more.

The application now covers, in the alternative, either kind of pipe line construction and it is proposed to finance the project by issuance and sale of common stock of $4,000,000 total par value, $2,000,000 6% preferred stock, $18,000,000 first mortgage bonds and $6,000,000 aggregate principal amount of unsecured notes.

Total distance of the line in the amended application is 800 miles, instead of 770.

■ ■

Dayton, Ohio, Permits Use of CP Ranges Without Flues

Dayton, Ohio, recently passed an ordinance amending the building code so that manufacturers may install CP ranges in the city without flue connections. Ranges not bearing the CP label must have a flue connection.

The Dayton Power and Light Co. and the Associated Dayton Gas Range Dealers immediately started an exposition including 11 makes of CP ranges. Approximately 500 dealers, distributors and salesmen attended a meeting to work out the campaign. Carl Sorby, promotion director for the George D. Roper Corp.; John E. Bogan, national sales counselor for the American Gas Association, and E. M. Rossiter, chairman of the local utilities dealer promotion committee, were present at the conference.

■ ■

English Publication Uses Material From GAS

The *Gas Times*, published by Hallows & Slaughter, Ltd., 29 Grove Road, Leighton Buzzard, England, carried on page 10 of their August 3, 1940, issue reprints of two of the series of pictures used in *GAS*, July, 1940, page 29.

The picture story referred to shows how the Southern California Gas Co., Los Angeles, Calif., connects domestic services.

On the same page in the *Gas Times* is an article entitled "Too Many Meetings" referring to a portion of Thermally Thinking. (*GAS*, August, 1940, page 15.)

■ ■

The General Controls Co. Moves To New Plant

The General Controls Co., Glendale, Calif., moved to its new and permanent factory at 801 Allen Avenue, Glendale, recently, according to company officials.

The new plant, on an 11-acre site, will house the general offices, research and testing laboratories, manufacturing facilities, and the Los Angeles screw machine division of General Controls.

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Reliance Regulators insure proper combustion of gas at the point of use. They guarantee positive lock-up and correct outlet pressure under variable load conditions.

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INDUSTRY *Personalities*

Reginald H. Field, engineer of the United Gas Pipe Line Co., Shreveport, La., recently won first place given by the American Gas Association to the student in the home study course on natural gas who showed the greatest benefits from the class, according to **C. M. Young,** professor of mining-metallurgical engineering at the University of Kansas.

Mr. Field took a course in engineering in Schenectady, N. Y., and began his business career with one of the United Gas Pipe Line Co.'s predecessor companies in 1927.

J. R. Butler, formerly with the Ohio Oil Co., has been selected as manager of the Cotton Valley Field recycling job near Shreveport, La. **John G. Huffman,** engineer, is assisting in preparation of the plans for the $2,000,000 project. More than 150,000,000 cu. ft. of gas will be processed daily.

J. Gordon Sweeney, formerly in charge of the Greenpoint Works Laboratory of The Brooklyn Union Gas Co., Brooklyn, N. Y., was recently appointed assistant chief chemist under **Edward J. Murphy,** chief chemist of the General Laboratory, following consolidation of the two departments. Prior to entering the employ of the company Mr. Sweeney was associated with the Seaboard By-Products Coke Co., of Kearney, N. J.

Alfred Schoenknecht, mechanics' foreman, West End Gas Works, Public Service Corp. of New Jersey, Newark, N. J., was recently given a dinner by his fellow-workers honoring the completion of 25 years of service with the company. **James H. Neighbour,** engineer of manufacture, Hudson Division, Gas Department, presented Mr. Schoenknecht with a gold badge.

M. C. Parrish, Jr., was appointed Oct. 5, assistant to the general manager in the state of New Mexico for both the New Mexico Gas Co., Santa Fe, N. M., and the Mexico Eastern Gas Co., Clovis, N. M., according to **J. R. Cole,** vice president and general manager of the Southern Union Gas Co., Dallas, Texas.

Mr. Parrish will have offices in Santa Fe, and will have supervision throughout the state.

Robert A. Hornby, vice president of Pacific Lighting Corp., San Francisco, was elected president of the Pacific Coast Gas Association for 1941 at the recent convention in Coronado, Calif.

John C. Pankow, director of sales, Detroit-Michigan Stove Co., Detroit, announced Oct. 8 a new field alignment, with four sectional sales managers in charge of territorial divisions. The divisions are Eastern, Southwestern, Central and Northwestern.

C. M. Jewell, former district manager for Detroit-Michigan in the New York area, is now sales manager of the Eastern division at Syracuse, N. Y.; **Paul Inskeep,** former regional sales manager, is sales manager of the Central division, Detroit; **J. M. Little,** former district manager in Texas, is sales manager of the Southwestern division, Dallas, Texas; **K. S. Gray,** former district manager in Iowa and Nebraska, is sales manager of the Northwestern division, Omaha, Neb. The new sales managers will have direct supervision of the district managers and because of strategic headquarters locations will be able to give the latter greater executive assistance than in the past.

George S. Jones, Jr., vice president and general sales manager, Servel, Inc., recently announced a number of new appointments and promotions to meet the needs of the 1941 sales program.

The gas commercial refrigeration department and air-conditioning department have been consolidated under the direction of **J. K. Knighton** with **Carl Conkey** in charge; **Robert J. Canniff** is in charge of the household refrigeration sales promotion department with **A. Jansen, Jr.,** as assistant; **A. D. Howard** is assistant manager of the sales promotion department for the Eastern half of the United States, and **C. A. Spiegel** is assistant sales promotion manager for the Western territory.

M. E. Lombardi retired on September 1 as vice president and director of the Standard Oil Co. of California, after more than 35 years with the oil industry. His retirement was due to ill-health. He was succeeded by **F. S. Bryant** as a director, and he was also

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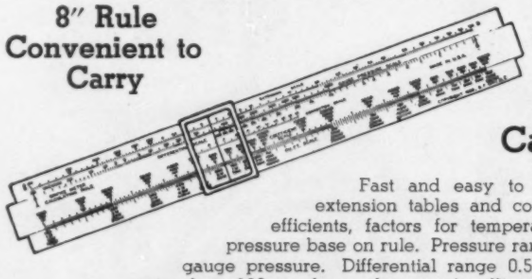

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appointed to the position of general manager of production, succeeding **W. G. Black**, who has also retired.

Caroline Ewing, recently named home service director of the Oklahoma Natural Gas Co., Tulsa, Okla., will also have supervision of all home service activities in Eufaula, Checotah, Bixby, Morris, and Weleetka, according to a recent announcement by **C. M. Van Slyke,** district manager of the company. Miss Ewing has replaced **Sarah Garrison,** former home service director.

Rosemary Locke has recently been appointed home service director of the Muskogee district of the company, replacing **Mary Frances Reece,** home service director for the past two and one-half years.

Leo G. Ranta, formerly an engineer of the Chicago District Pipeline Co., Chicago, Ill., a subsidiary of The Peoples Gas Co., was appointed assistant general superintendent of the Chicago District Pipeline Co. recently, according to an announcement by **W. G. Rudd,** vice president.

The same announcement revealed that **George R. Boddeker,** formerly assistant superintendent of Central District, has been appointed assistant to the general superintendent of the Chicago District Pipeline Co.

Benjamin F. Tucker, meter inspector in New Iberia, La., for the United Gas Pipe Line Co., Houston, Texas, was recently promoted to district measurement superintendent for the company in the Southwest Louisiana district to replace **Thomas G. Craig,** who has been transferred to the San Antonio district of the company as measurement superintendent, according to a recent announcement from **F. B. Winberry,** district manager.

Mr. Tucker has been with the company since 1933; Mr. Craig has had eight years with the company.

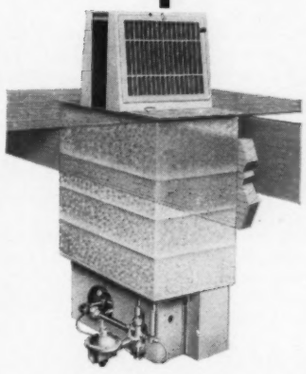
William Russell Emerson, vice president and secretary-treasurer of the Oklahoma Gas and Electric Co., Muskogee, Okla., retired recently after 35 years with the company, according to **J. F. Owens,** president. He started as a laborer at a salary of $30 a month.

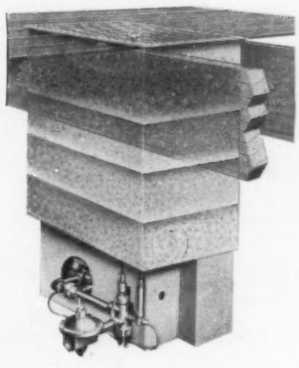
Thomas H. Sterling, Western district manager of the Oklahoma Natural Gas Co., Tulsa, Okla., was recently appointed chairman of the re-organized military affairs committee of the Oklahoma City chamber of commerce. He replaces **Brigadier General Ray McLain** who resigned to go to camp with the national guard. Mr. Sterling will re-organize the military affairs committee so that it will be able to fully cooperate in the National Defense program.

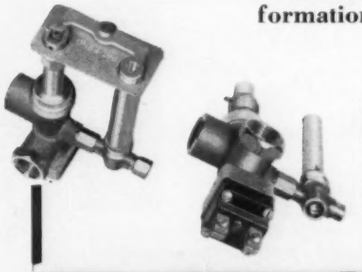
A luncheon was given recently at the Penn Lincoln Hotel, Wilkinsburg, Pa., in honor of **Joseph Klein,** a foreman of Pittsburgh Equitable Meter Co.'s meter shop, who rounded out 50 years of continuous service for the company. Among those who paid tribute to Mr. Klein were **Colonel W. F. Rockwell,** president of Pittsburgh Equitable, and **Horace Chrisman,** a veteran who completed 50 years of service two years ago. Mr. Klein was presented with a purse as a tribute for his service record.

Albert F. Cook, advertising manager of the range division of the Association of Gas Appliance and Equipment Manufacturers, New York, N. Y., recently resigned his position due to ill health.

Prior to joining the A. G. A. E. M. he had served for 10 years as assistant advertising manager of the Philgas Department of Phil-







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lips Petroleum Co., Bartlesville, Okla., and has had other experience in newspaper, advertising agency and sales promotion activities.

Robert R. Guenther, Amos Mears and **Millard Cook** have been appointed district sales managers and **J. L. Case,** district sales manager for upper New York State, has been transferred to the West Coast. **R. N. Lindgren** is assigned to the Upper New York area. **Lyman Hill** is new director of research.

Lyle C. Harvey, president and general manager, The Bryant Heater Co., Cleveland, Ohio, has been elected to the board of directors of Dresser Manufacturing Co., Bradford, Pa., according to a recent announcement by **H. N. Mallon,** president. Mr. Harvey became head of The Bryant Heater Co., a wholly owned subsidiary of Dresser Manufacturing Co., in March, 1938, after serving as vice president from June, 1933, the date of Bryant's acquisition.

J. T. Sutliff was recently put in charge of the Chicago office of the Roots-Connersville Blower Corp., Connersville, Ind., to succeed the late **William Townsend. E. A. Coons,** a graduate engineer, will assist Mr. Sutliff.

J. D. Davis has been appointed district manager of United Gas Pipe Line Co. at Jackson, Miss., to succeed **J. P. Rogers,** who died recently, according to an announcement by **N. C. McGowen,** president.

Mr. Davis has served as Jackson district pipe line superintendent for the past eight years. He entered the service of one of United's predecessor companies in 1924 as a timekeeper, advancing to district foreman at Beaumont, Texas, in 1930. He was made section foreman at Nederland, Texas, in 1932 and in the same year was transferred to the Jackson district of the company. He attended the University of Texas at Austin, where he studied chemical engineering.

Percy H. Winch, assistant superintendent, Public Service Electric and Gas Co., Newark, N. J., was promoted Oct. 1 to superintendent of the Camden Coke Plant, succeeding **Wilmer K. Allebach,** who died recently, according to an announcement by **John A. Clark,** president of the company.

Walter B. Tully, assistant to the superintendent, was made assistant superintendent to fill the vacancy made by Mr. Winch.

Mr. Winch started with the company in 1923 as a cadet engineer at the West End Gas works. He was made assistant superintendent in 1934. Mr. Tully started with the company as a cadet engineer in 1923.

John J. Barada, safety director, The Laclede Gas Light Co., St. Louis, Mo., was recently appointed a special representative of the United States Department of Labor to promote industrial safety and health under the national committee for conservation of man power in defense industries.

T. B. Gregory, chairman of the board of the Manufacturers Light and Heat Co., Pittsburgh, Pa., celebrated his 80th birthday Oct. 15. He has been associated with the gas industry for 56 years and is active in the Pennsylvania Natural Gas Men's Association golf tournaments.

George H. Schlatter, secretary-treasurer of the Southern Gas Association for three and a half years, is now affiliated with the American Stove Co., according to reports.

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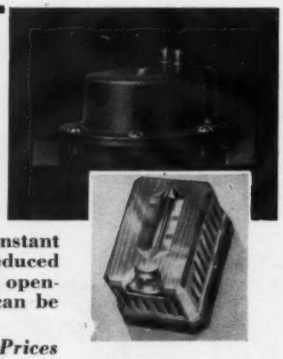

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OBITUARIES

George Bruce Cortelyou

George B. Cortelyou, retired president of the Consolidated Gas Co. of New York., New York City, (formerly Consolidated Edison Co. of New York) died Oct. 23 at his home in Huntington, Long Island. He was 78 years old. He joined the company in 1909 as president and trustee just after he had retired as secretary of the treasury in President Theodore Roosevelt's cabinet.

During the 26 years he served as president, the company's personnel grew from 11,000 to 45,000 and the assets of the company increased from $332,324,856 in 1909 to more than $1,300,000,000 in 1934. He joined the Quarter Century Club in 1935.

■ ■

Charles G. Groff

Charles G. Groff, chairman of the board of directors of Servel, Inc., and president and chairman of the board of directors of the Electrolux Corp., died Oct. 24 at Belle Haven, Greenwich, Conn.

He became president of the Electrolux Corp. in 1933 and in 1934 was made chairman of the board of directors of Servel, Inc. During his life he had worked for newspapers in both the editorial and advertising departments and has been engaged in sales promotion work. He acquired a national reputation as a consultant on selling problems.

■ ■

V. B. Sanders

V. B. Sanders, assistant to the vice president in charge of finance and accounting, Public Utility Engineering and Service Corp., died recently in Evanston, Ill., after a long illness. He was 53 years of age.

Mr. Sanders had been associated with the Standard Gas and Electric Co., New York. N. Y., since 1910, when he was first employed by Oklahoma Gas and Electric Co. as assistant to the auditor in Oklahoma City.

■ ■

Albert Lucien Clough

Albert L. Clough, vice president and director of the Manchester Gas Co., Manchester, N. H., died recently following a long illness. He was first elected a member of the board of directors of the company in 1912 and was prominent in civic, cultural and business affairs in the East, according to reports.

■ ■

Francis X. Engel

Francis X. Engel, vice president, secretary and general superintendent of the Elizabethtown Consolidated Gas Co., Elizabeth, N. J., died recently at his home at the age of 87.

He had been employed by the company for 68 years and in 1937 was given a dinner and a watch in honor of his 65 years of service.

■ ■

Gordon Davidson

Gordon Davidson, chief engineer, Natural Gas Pipeline Co. of America, Chicago, Ill., died recently in Chicago. He joined the natural gasoline division of the Cities Service Oil Co. in 1919 and was general superintendent of that division when he joined the Natural Gas Pipeline Co. in 1931.

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Because they are engineered and manufactured by John Zink, who has a world-wide reputation for the production of Good Burners.

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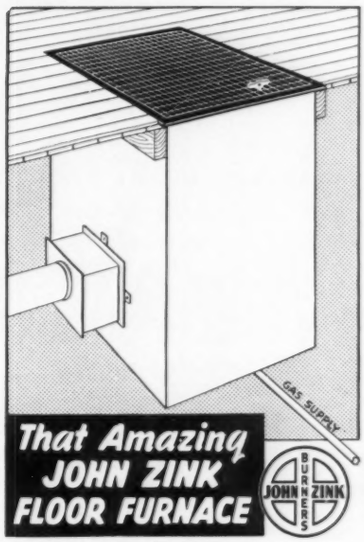


JOHN ZINK COMPANY

Burners • Floor Furnaces • Unit Heaters

TULSA, OKLAHOMA NEW YORK CITY

To Get the PIPE in the Ground . . .

Use "CLEVELANDS" and *Watch Your Costs Go Down!*

Model 95

MODEL 95—The Famous "Baby Digger" pioneered and perfected by "Cleveland," known and used every day by Gas Companies the country over.
Answers every requirement for distribution work. An unbeatable combination of speed, maneuverability, power and ditch-capacity, in a small mobile unit. Digs 11" to 23" in width. 5½' in depth.

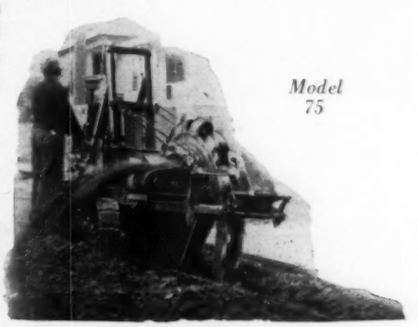
Model 80

MODEL 80—for Laying Pipe—Filling and Compacting Trenches. The "80" applies machine-savings to the pipelaying and backfilling operations. Speeds up the work, does a 100% job of trench-compacting at much lower costs. Works in limited spaces.
A machine of such genuine utility, you'll wonder how you ever got along without it.

. . . and NOW! Model 75

A STILL SMALLER TRENCHER FOR SERVICE and SMALL DIAMETER PIPE . . . The latest "Cleveland" achievement, the "75" weighs but 7000 pounds! Is only 45 inches wide! Digs 8 to 12 inches width, 3½ ft. depth.

At last! A tiny trencher, for small trench, that has the required strength and durability.



Model 75

Ask for Information TODAY on These Modern Machines

THE CLEVELAND TRENCHER CO.

"Pioneer of the Small Trencher"

20100 ST. CLAIR AVENUE CLEVELAND, OHIO

GASAIR

GASAIR MIXERS AND VAPORIZERS

150 to 50,000 C.F.H. Capacity

•

GASAIR VAPORIZERS

For Straight Vapor Installations

ELIMINATE UTILITY and INDUSTRIAL SHUT-OFF

"The Only Complete Gas-Making Unit Operating Without Outside Power"

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GASAIR CORPORATION

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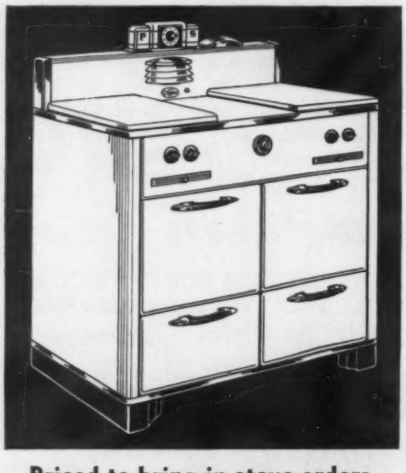
STANDBY

CROWN

FALL FACTORY GAS RANGE SPECIAL



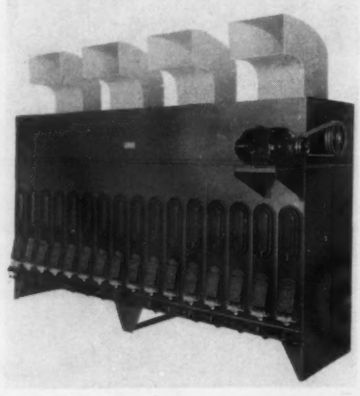
Priced to bring in stove orders for you during the fall season.
ACT NOW
Write for Details

CROWN STOVE WORKS
4631 W. 12th PLACE, CHICAGO
Originators of BUFFET and DIVIDED-TOP GAS RANGES

MODERN *Products*

Industrial Space Heater

L. J. Mueller Furnace Co., Milwaukee, Wis.
Description: Newly designed gas-fired unit heater particularly suited to large space heating requirements such as factories, warehouses, auditoriums, hangars and similar buildings having no basement. They are also adapted to industrial applications such as drying. They are available in floor or suspended types. Air intake may be as shown, or from front or back. Discharge cowls may be at any height and warm air directed in any manner suited to installation. Different air temperatures are possible through each individual discharge. Safety pilot is used in each section, and thermostatic control of the unit may be operated with full air volume for distribution and a portion of the heating sections in operation, thus securing more uniform temperature control in mild weather. When installed, the unit heater need not be a permanent part of the building, but is movable. The standard unit with 13-in. fans is usually employed. Where a large volume of air is to be heated through a comparatively small temperature rise, the greater air volume is secured by 15-in. fans. The units are available in a large range of sizes from an A. G. A. input rating of 270,000 to 1,080,000 B.t.u.'s.



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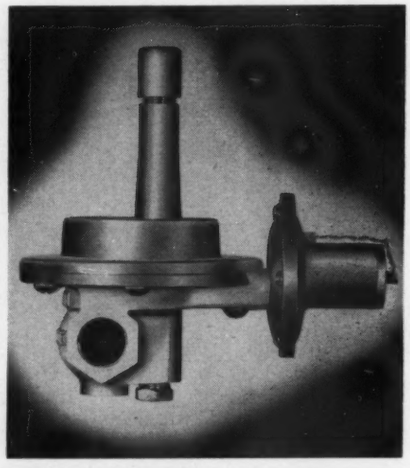
Fire-Quake Valve

Security Valve Corp., Los Angeles, Calif.
Description: A new automatic, low pressure cut-off valve that remains positively closed under all conditions. The patented feature of this valve is that the diaphragm control and valve seat are disassociated as soon as the valve operates from lack of pressure. This eliminates any possibility of a valve seat leak building up pressure to again open the valve. The valve is operated by a sensitive diaphragm, set to any predetermined pressure, and as long as the gas pressure is maintained, this diaphragm holds back the plunger rod. When the pressure drops to a predetermined point, the spring releases the plunger rod and the ball drops from the pedestal to close the gas inlet. As the valve seat is completely separated from the diaphragm control, once the valve has operated, returning pressure can only increase the tightness of the seal. The valve cannot be reset manually until gas is again returned to lines. When pressure is returned, valve can be reset by tenant or gas company by simply removing the cap and lifting the plunger that sets the ball on the pedestal. Valves also operate automatically from earthquake shocks, explosions or tornados. Heat from fire fuses the metal pedestal to operate the valve. Where valves are installed, gas companies may close all feeder lines, in case of emergency, without closing service stop cocks in every building. Valves offered for gas services from ¾-in. to 1¼-in.



■ ■

Low Pressure Regulators

General Controls Co., Glendale, Calif.
Model: V-300 Series.
Description: Small, compact regulators available in sizes from ⅜ in. to 1¼ in. with standard outlet pressure sealed at 3½ in. water column, but with a minimum outlet pressure of 2 in. and a maximum of 5 in. water column. All internal parts are resistant to corrosion for all natural and manufactured gases. Small regulator bodies of ⅜ in. and ½ in. are of sand-cast aluminum; larger sizes are of cast iron. Diaphragms are of best grade leather, oil-treated for long life. Rugged single-seated valve principle assures positive alignment and simplified control with a minimum of pressure drop.

Each regulator is tested and checked for setting, leakage, and lock-up, then sealed at the desired pressure. A. G. A. approval has been obtained and the company claims high capacity, close regulation and low cost.

Fluor Corp. Passes 50th Anniversary; Moves To New Los Angeles Quarters

CELEBRATING its 50th business anniversary, the Fluor Corp., nationally known gas engineering and construction firm, moved into a new office and plant in Los Angeles this fall and entertained members of the gas, oil and allied industries at an open house October 8.

The new quarters cover 12½ acres of ground, and buildings now completed, or under construction, furnish 60,000 ft. of floor area. General offices use 10,000 sq. ft. and are equipped with a complete air cooling and warm air circulating system. Other buildings house the cooling tower mill, pattern shop, machine shop, and construction equipment warehouse.

The company was founded in 1890 by J. S. Fluor who, at 74, still retains the office of president of the Fluor Corp., though he has relinquished the duties of active management to his two sons, P. E. Fluor, executive vice president and general manager, and J. S. Fluor, Jr., vice president and assistant general manager.

■ ■

Dresser Manufacturing Buys Pacific Pump Co. of Huntington Park, Calif.

Dresser Manufacturing Co., Bradford, Pa., has purchased the Pacific Pump Co. of Huntington Park, Calif. J. B. O'Connor, vice president and sales manager of Clark Brothers Co., Inc., Olean, N. Y., a Dresser subsidiary, was named chairman of the board of Pacific Pump.

Other officers of Pacific are: A. R. Weis, formerly Pacific Pump vice president, president; R. E. Reimer, treasurer of the Dresser Co., secretary-treasurer. Directors include J. B. O'Connor, A. R. Weis, H. N. Mallon, C. P. Clark and R. E. Reimer.

The Dresser Manufacturing Co. and Clark Brothers Co. will now have a Pacific coast plant and organization while the Pacific Pump Co. will benefit through plant and sales representation in the east on a much broader scale than was possible heretofore, according to a statement by Mr. Weis.

The Pacific Pump Co. was established in Huntington Park, Calif., in 1924.

■ ■

Gas Provides Refrigeration For Cold Storage Lockers

Gas provides refrigeration for a new type of business recently established in Arkansas City, Kan., known as the "Zero Locker Service." Four hundred individual lockers, finished in white baked enamel are housed in a building in which vegetables, meats and other perishables are frozen.

The refrigeration machinery is driven by a 22-hp. engine, powered by natural gas. Norman Austin is the owner of the business.

■ ■

West Virginia Ass'n. Holds Meeting; Plans Merger With Virginia Group

The 22nd annual convention of the Public Utilities Association of West Virginia was held at White Sulphur Springs, Oct. 4-5. G. L. Furr, Appalachian Electric Power Co., Bluefield, W. Va., was elected president.

The Association acted favorably on a proposition to set up one association for the two Virginias. If the utilities in Virginia agree to the plan the association will be known as "The Public Utilities Association of the Virginias." The executive staff of the present association will function for the two states.

■ ■

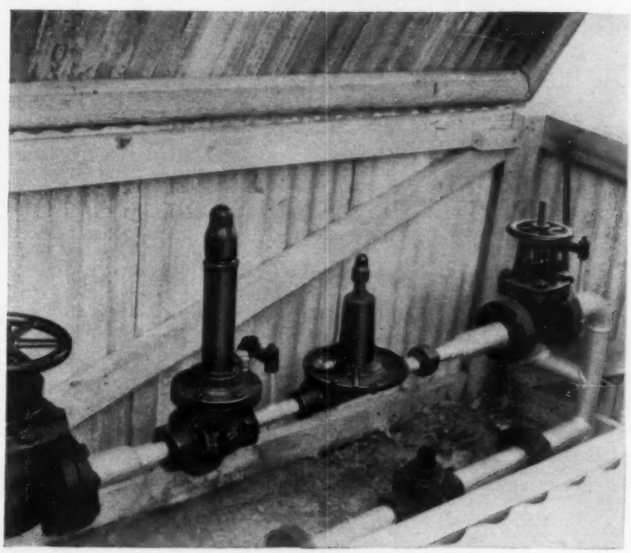
Chemical Men Will Convene In Chicago

New discoveries and developments in the service of chemistry and its application and progress in many fields of activity will be discussed by foremost authorities in America at an Industrial Chemical Conference, which will be a feature of the National Chemical Exposition to be held December 11-15 at the Stevens Hotel, Chicago, Ill.

■ ■

Employes Insured By Gas Service Co.

The Gas Service Co., Kansas City, Mo., recently wrote more than $1,000,000 of group insurance covering nearly 1000 employes in Missouri, Kansas, Nebraska, and Oklahoma, according to an announcement by B. C. Adams, vice president and general manager. The cost is to be shared by the company with provision for payments also for accidental death, loss of limbs or eyesight.



A Double Reduction High Pressure Installation near West Lake, La. United Gas Corporation, Lake Charles, La.

For high pressure Gas Control, REYNOLDS builds Regulators capable of reducing pressures as high as 2,000 pounds, but Reynolds Engineers recommend the greater safety of Double or Triple reduction installation. In the photograph above, we show an actual field installation. The first Regulator will handle pressures up to 1,000 pounds inlet pressure, reducing same to 100 to 250 pounds outlet pressure. In the second stage the inlet pressure of 100 to 250 pounds is reduced to an outlet pressure of 15 to 40 pounds. Pressure desired, size of pipe connections and other factors govern actual outlet pressures. All Reynolds High Pressure Regulators have the same extreme flexibility of control range that feature all Reynolds Regulators. Let the Reynolds Engineering Department aid in solving your Gas Control Problems.

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423 Dwight Building
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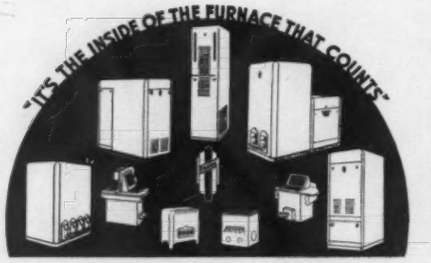
Gas Control Since 1892

REYNOLDS GAS REGULATOR CO.
ANDERSON, INDIANA, U. S. A.



USER SATISFACTION
EASIER SALES
EASY INSTALLATION

The advanced engineering principles, finer materials and modern eye-appealing cabinets of Fraser Warm Air heating equipment make SELLING EASIER . . . CUSTOMER SATISFACTION GREATER.

Fraser units come in types and sizes to fill every heating need. Their simplified assembly, wired controls and many other features assure time-saving installation. Their years of service-free operation and maximum operating efficiency combine to build your profits and user satisfaction.

Fraser specializes exclusively on gas-fired, warm air heating. Already one of the country's largest plants steadily increasing demand has recently necessitated doubled manufacturing space. Prompt shipment now assured.

FRASER
H. R. BASFORD CO. DISTRIBUTORS SAN FRANCISCO LOS ANGELES
GAS HEATING EQUIPMENT
FRASER FURNACE CO. MANUFACTURERS STOCKTON CALIFORNIA

Lone Star Gas Company Holds Annual Meeting

THE annual meeting of foremen, district managers and other key men of the Lone Star Gas Co., Dallas, Tex., was recently held in Dallas and the industry's responsibility to the national defense program, ways to improve customer service, and preparations for winter fuel demands were the pertinent topics of discussion.

D. A. Hulcy, new Lone Star president, framed an enlargement of the late president L. B. Denning's axiom, "Find out what is the right thing to do and then the right way to do it." He declared the company ready to meet any emergency and also conducted a brief memorial for the late Mr. Denning.

Elmer F. Schmidt, vice president and operating manager of the company, presided at the meeting. Chester L. May, president of Texas Cities-Community Natural Gas Companies, spoke on "Operations Plus," stressing united effort of the system companies. He also addressed the transportation division men and R. A. Minter, office engineer, and John P. Viglini, assistant, gave an analysis of the operations on the peak day of the 1939-40 season.

Entertainment consisted of a question and answer program called "Cranium Crackers," and the dramatization of a skit and sample radio broadcast which offer homemaking aids to housewives. Twenty-five year men were also honored at a luncheon.

■ ■

New England Accountants Meet In Hartford, Conn.

The accounting Division of The New England Gas Association held its meeting Sept. 26 at Hotel Bond, Hartford, Conn., according to an announcement from Vincent Farnsworth, Jr., secretary-treasurer.

W. A. Miller, commercial office manager, Malden and Melrose Gas Light Co., Malden, Mass., commented on the subject of "How About Gas Bills?"

Vincent Farnsworth, Jr., assistant auditor, Boston Consolidated Gas Co., Boston, Mass., discussed the methods of handling the payroll of that company.

G. Harvey Faulkner, Providence (R. I.) Gas Co., presented a report on "Order Design and Routine."

■ ■

Chicago A. P. I. Convention To Discuss Progress, Trends

Technological progress in every branch of the petroleum industry, future trends and problems, and economic and other national factors affecting the industry will be discussed at the 21st annual meeting of the American Petroleum Institute, Nov. 11-15, in the Stevens Hotel, Chicago, Ill.

The preliminary program calls for two general sessions, eight group sessions, and nearly 100 committee meetings. Six speakers will deliver addresses at the two general sessions. They include Institute president, Axtell J. Byles; Colonel T. H. Barton, of Lion Oil & Refining Co., El Dorado, Ark.; William J. Cameron, of Ford Motor Co., Detroit, Mich.; Congressman Martin Dies, of Texas; and president H. A. Prentis, Jr., of the National Association of Manufacturers.

■ ■

Gas Salesmen Receive Above Average Pay

A recent survey of the Domestic Sales Committee of the Pacific Coast Gas Association, shows that the average gas company salesman earns a wage well above the national average. Fourteen gas companies with a total of 279 domestic salesmen averaged $2253 per man.

Of companies reporting, four pay straight salaries, one a salary and a bonus, and nine salary and commission.

Eliminates Distortion of Plug in Barrel

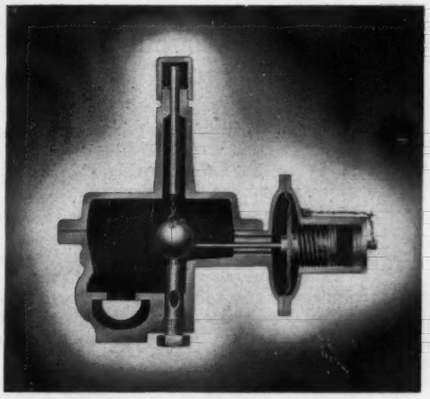
Eliminates Weight of Valve Rod on Plug

MGSCO Patented SOCKET HEAD CONNECTOR for FLOOR FURNACE VALVES

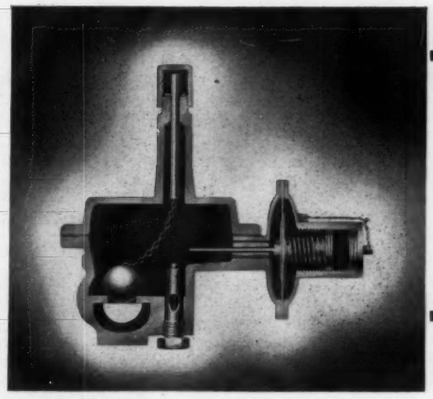
Write for Complete Catalog

Milwaukee Gas Specialty Company
MILWAUKEE WISCONSIN

The auditorium of the **Payne Furnace & Supply Co.** in Beverly Hills, Calif., was the scene, September 5, of an interesting cake-baking contest, sponsored by **Southern California Gas Co.,** to culminate a four-weeks' cooking course conducted for junior members of the smart set in Beverly Hills and West Los Angeles. A part of a summer program to acquaint youngsters of both sexes in modern gas cooking appliances, the Beverly Hills activity attracted a large number of local college girls and Junior League members. The picture above shows a cake-baking class in which each student cook baked a layer cake in one of the modern CP gas ranges seen in background. **Cecyl Nelson**, Southern California Gas Co. home economist, was in charge of the classes.



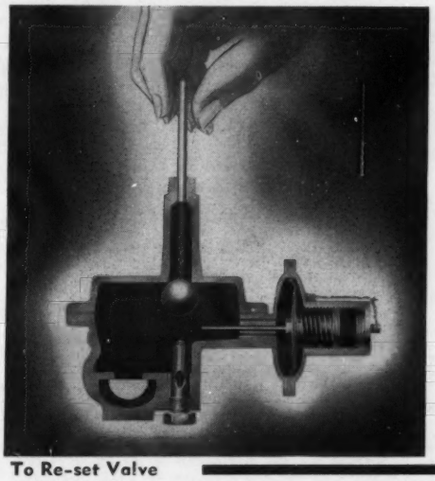
Valve Open



Valve Closed

PROTECTION is POSITIVE

• When the valve is closed, the diaphragm control and valve seat are completely disassociated. There is no possibility that a valve seat leak can build up pressure to open the valve.



To Re-set Valve

A NEW AUTOMATIC LOW PRESSURE EARTHQUAKE AND EXPLOSION SHUT-OFF

For instant and positive gas shut-off on domestic service—whenever supply fails, even momentarily.

***When Pressure Drops*—Diaphragm moves to unseat valve ball. *At Any Severe Shock*—Ball is unseated and closes valve. *In Case of Fire*—Pedestal is fused, and ball drops.**

Where Security Valves are installed, feeder lines can be closed in emergencies, without closing service stop cocks. Security Valves are easily re-set.

For complete specifications and prices, write today, to

SECURITY VALVE CORPORATION

548 South Spring Street — Los Angeles, Calif.

GREENLEE HYDRAULIC PUSHERS ON THE JOB

These photographs of Greenlee Hydraulic Pipe Pushers, taken right out on the job, show how easy it is for one or two men to push pipe underground by simply pumping the handles. These pushers eliminate trenching, back-filling, and the tearing up of pavements and sidewalks . . . are easy to set up . . . and do the job easier and faster.

1. This shot shows a Greenlee No. 790 in the 3rd sub-basement of a Chicago Hotel pushing 168 feet under Michigan Boulevard. This tough push on an angle was made in 9 hours.

2. Here is the Greenlee No. 790 pushing 3-inch pipe under U. S. Highway 51 without disturbing the pavement or traffic.

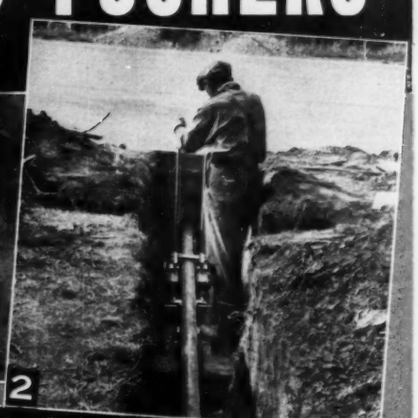
3. This photograph shows two Greenlee No. 795 pushers with 75 ton pressure each, set up to push 36-inch concrete duct 70 feet under two railroad tracks.

4. Shown here is a Greenlee Pusher pushing pipe under the concrete flooring in an industrial plant without moving machines or tearing up the floor.

Write today for complete details.

GREENLEE TOOL CO.
1700 Columbia Ave.
ROCKFORD, ILLINOIS

1



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GREENLEE HYDRAULIC PIPE PUSHERS

EASIER AND FASTER FOR THE MAN ON THE JOB

Fair Labor Standards Act Revised For Office Workers

CLASSIFICATION of white collar employes who need not be paid overtime after 40 hours a week were re-defined recently in amended regulations affecting almost all interstate commerce establishments by Colonel Philip B. Fleming, administrator of the wage and hour division, U. S. Department of Labor. These regulations went into effect Oct. 24, 1940, the same day on which the standard workweek under the Fair Labor Standards Act (Federal Wage and Hour Law) became 40 hours.

The principal change under the act is a separate definition for "administrative" employe, heretofore defined together with "executive." An executive as defined remains one whose primary duty consists in management and who, among other qualifications, gets $30 a week or more. Administrative employes are defined to include those whose duties, while important and associated with management, are functional rather than supervisory, and who are paid not less than $200 a month.

Further information may be obtained from the Wage and Hour Division, U. S. Department of Labor, 1375 Constitution Ave., Washington, D. C.

■ ■

Canada May Manufacture Chemicals From Gas

THE Consolidated Mining & Smelting Co. of Canada will, at the request of the Dominion government, investigate the feasibility of establishing plants for the production of war chemicals from Alberta natural gas, according to S. G. Baylock, president and managing director of the company.

A preliminary survey is being conducted, and a chemical analysis is being made of the various gases to determine whether or not they contain undesirable impurities. The survey will also determine the amount of gas available for chemical manufacture.

For the first five months of 1940, Canada produced from all fields 18,432,415,000 cu. ft. against 17,223,445,000 cu. ft. in the same period of 1939, an increase of 7%.

Natural gas production marketed from all Canadian fields in the month of May totaled 2,227,939,000 cu. ft. compared with 2,120,534,000 cu. ft. in May last year. Imports of mixed gas into Canada in May amounted to 7,069,000 cu. ft. worth $5236, compared with 11,532,000 cu. ft. at $8062 in April.

■ ■

S. B. Finch Will Head Group To Carry on Fair Work

Stanley B. Finch, Brooklyn Union Gas Co., Brooklyn, N. Y., and co-ordinator for the gas industries at the New York World's Fair, has been elected secretary-treasurer of "The Pavilionaires, Inc.," a newly organized group which will maintain on a permanent basis the functions and work of the present World's Fair Exhibitors Association. The object of The Pavilionaires is "to preserve and add to the knowledge gained at this and other major expositions, and to make it available to business, industry and managements of future fairs." Col. Sherman A. Snapp, director of the Standard Brands Building at the World's Fair, was named the first president .

During the past three years Mr. Finch has served as assistant to Hugh H. Cuthrell, president of Gas Exhibits, Inc., in the capacity of co-ordinator and liaison official.

■ ■

Capacity of Gas Plant In Walla Walla Increased

Completion of a new $40,000, 100,000 cu. ft. coal-oil-water type gas bench in Walla Walla, Wash., was announced by E. R. Lane, Walla Walla manager for the Northwest Cities Gas Co. This will increase the capacity of the local plant 50% and will relieve the load on the system which resulted from an increase of sales during the past year.

This is the first step in a program which involves complete modernization of the local plant. The plant was installed by the Improved Equipment-Russel Engineering Co., New York City.

■ ■

Cost Accountants Convene

The Louisville Chapter of the National Association of Cost Accountants held its opening meeting recently at the Brown Hotel in Louisville. A. J. Kieffer, fixed capital accountant, Louisville Gas and Electric Co., Louisville, Ky., was elected president.

American Recycling Ass'n. Will Hold Short Course

THE annual short course on Natural Gas Recycling will be held Nov. 5-6 at the Texas College of Arts and Industries, Kingsville, Tex. J. O. Loftin, president of the college, will welcome the delegates.

Henry Wade of Parkhill-Wade, Los Angeles, Calif., will speak on "Methods of Condensate Recovery and Discussions," during the morning session of the first day. In the afternoon there will be an inspection trip through condensate plants and the banquet in the evening will be followed by a business meeting.

The program for the morning of the second day consists of addresses by E. V. Foran on "Production of Sub-surface Flows and Discussions" and by George Granger Brown on "Deviation of Natural Gas from Boyle's Law."

In the afternoon, three talks will be given. Dr. F. H. Dotterweich will speak on "Physical Properties of Hydrocarbon Mixtures in Condensate Production;" Dr. Walter J. Podbielniak has chosen "The Operation of the Podbielniak Apparatus;" and Dr. O. L. Roberts will discuss "Gas Hydrates."

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933.

Of GAS, published monthly at Los Angeles, California, for October 1, 1940.

State of California, County of Los Angeles—ss.

Before me, a notary public in and for the State and county aforesaid, personally appeared Jay Jenkins, who, having been duly sworn according to law, deposes and says that he is the publisher of GAS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Jay Jenkins, 1709 W. 8th St., Los Angeles, Calif.

Managing Editor, Arthur Rohman, 1709 W. 8th St., Los Angeles, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

Western Business Papers, Inc., 1709 W. 8th St., Los Angeles, Calif.

Jay E. Jenkins, Los Angeles, Calif.

James E. Jenkins, Los Angeles, Calif.

Craig Espy, Dallas, Texas.

George H. Finley, Santa Barbara, Calif.

Arthur Rohman, Los Angeles, Calif.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is (This information is required from daily publications only.)

JAY JENKINS.
(Signature of publisher.)

Sworn to and subscribed before me this 27th day of Sept., 1940.

(Seal) SUSAN McCONNELL.

(My commission expires June 8th, 1943.)

GEORGE A. BURRELL

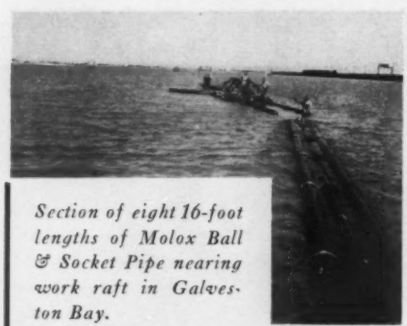
Petroleum and Gas Engineer

Design—Construction—Reports

■

Suite 1909
20 Pine Street
New York City

1936-42 5th Avenue
Pittsburgh, Pa.



Section of eight 16-foot lengths of Molox Ball & Socket Pipe nearing work raft in Galveston Bay.

Second Submarine Gas Line of 8" Molox Ball & Socket Pipe Laid Across Galveston Bay

REPLACING non-corrosion-resisting pipe which failed in service, two submarine lines of 8" Molox Ball & Socket Pipe have been laid across Galveston Bay, a distance of approximately 10,000 feet. Design of the Molox Ball & Socket Joint, which permits extremes of deflection, and inherent ruggedness and corrosion resistance of the pipe itself, makes Molox Ball & Socket Pipe ideal for "super service installations" like this.

Write for Literature

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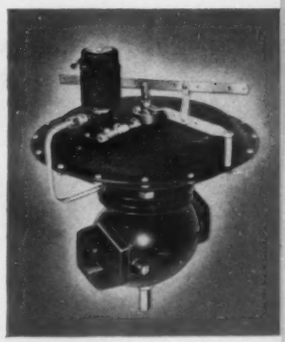
Quick Quiz on Gas Valves for Industrial Uses

Q: WHAT IS THE MOST VERSATILE, POPULAR AND LOGICAL GAS HEATING CONTROL FOR WARM AIR FURNACES, GAS FIRED BOILERS, CONVERSION BURNERS, ETC?

A: **GENERAL CONTROLS K-3B,** the pioneer and leader in its field. Here are 10 outstanding advantages: (1) Quiet AC solenoid, (2) Two wire, current failure principle, (3) Designed to eliminate magnetic sticking, (4) Rotatable conduit connection, (5) Interchangeable coils, (6) Bonnet union construction for accessibility, (7) Minimum number of working parts, (8) Reduced current consumption, (9) Impact action stainless steel plunger, (10) Greatest range in sizes, ⅜″ to 6″. Write for Catalog for complete details.

Q: WHEN SPECIFICATIONS CALL FOR A SLOW OPENING DIAPHRAGM TYPE VALVE, WITH ADJUSTABLE OPENING SPEED AND AIR LOUVRE OPERATOR, WHAT CONTROL IS JUST RIGHT?

A: **GENERAL CONTROLS B-55,** of course. The B-55 is a two-wire, current failure valve, with only two moving parts. Requires no oiling or servicing, year in and year out, and it's easy to install. Its adjustable opening speed is extremely desirable for installations of domestic and commercial heating gas burners, boilers and furnaces, where conditions of variable ignition, combustion and gas pressure exist. Sizes, ¾″ to 6″. Write for Catalog for complete details.



Q: WHAT MOTOR VALVE HAS CREATED UNIVERSAL INTEREST AND GAINED INSTANT ACCEPTANCE BECAUSE OF ITS UNIQUE DESIGN THAT SIMPLIFIES VALVE CONTROL INSTALLATIONS?

A: **GENERAL CONTROLS HYDRAMOTOR VALVE,** one of the most versatile valves ever developed for positive, accurate control of gasses, vapors and liquids. Operates on a simplified two-wire control. Valve is full ported and will operate in any position. Entire operator (an ingenious hydraulic pump and bellows) is sealed in oil for life; no annual maintenance; no gears to wear out. Handles pressures up to 125 lbs., temperatures up to 250° F. Sizes, ½″ to 6″. Write for Catalog for complete specifications and details.

Q: WHO IS ONE OF YOUR MOST RELIABLE AND COMPLETE SOURCES OF SUPPLY FOR FUEL GOVERNORS, MANUAL RESET VALVES AND OTHER GAS VALVES FOR INDUSTRIAL USES?

A: **GENERAL CONTROLS CO.,** 450 East Ohio Street, Chicago, Illinois • 25 No. Live Oak Street, Houston, Texas • 1505 Broadway, Cleveland, Ohio • 421 Southwest Boulevard, Kansas City, Missouri • 915 Bryant Street, San Francisco, California • 267 Fifth Avenue, New York City • 801 Allen Avenue, Glendale, California • 6432 Cass Avenue, Detroit, Michigan • 687 Boylston Street, Boston, Massachusetts

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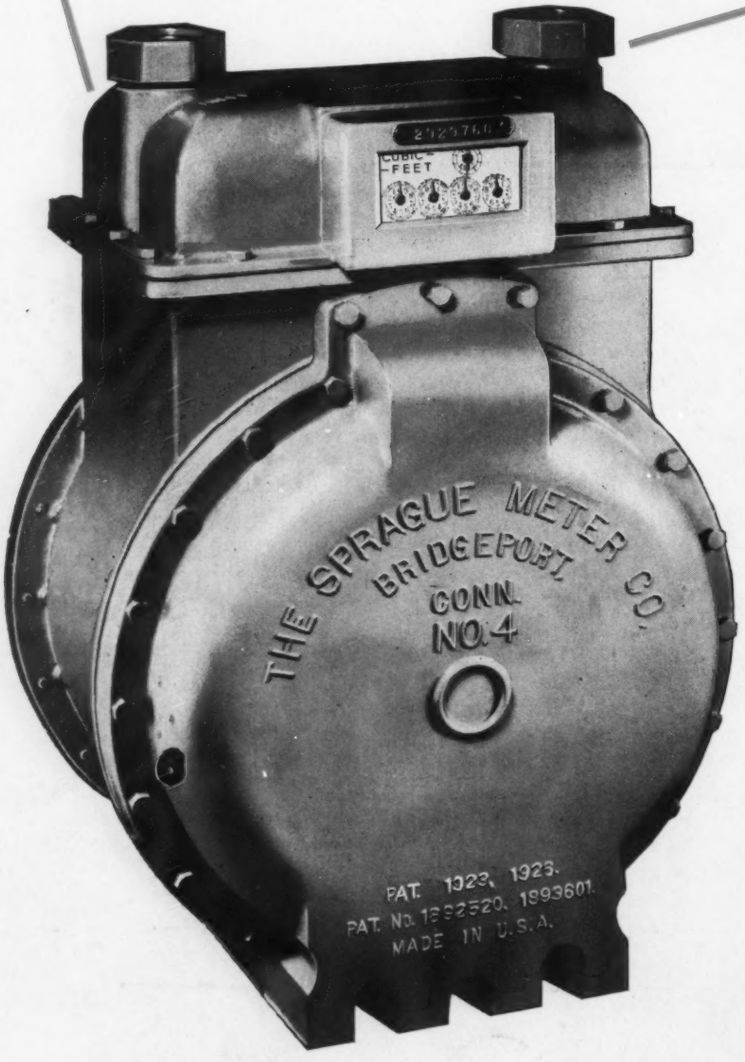

SPRAGUE No. 4 Meters

MEET THOSE REQUIREMENTS

CAPACITY:

600 cu. ft. ½"

1350 cu. ft. 2"

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THE SPRAGUE METER CO.

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